TAHOE IN DEPTH

Protecting, Enjoying & Exploring the Lake Tahoe Basin

Winter 2019 ■ Issue #16

Falcons make comeback at Lake Tahoe

Hikers, rock climbers help give nesting raptors room to grow

By T. Will Richardson and Jennifer Pennington
TAHOE INSTITUTE FOR NATURAL SCIENCE

In June 2019, Mark Enders, wildlife biologist with the Nevada Department of Wildlife, was perched on a rocky ridge about 200 meters west of Castle Rock, near Kingsbury Grade in Nevada. Peering through a spotting scope at a cliffside grotto, he confirmed the presence of two downy young peregrine falcons.

By the end of July, these young had fledged (matured to the point of flying away from the nest), joining the growing ranks of falcons successfully produced at Tahoe in recent years.

This success was particularly rewarding, however, for biologists who have been monitoring this nest site and working with local recreational groups.

After being nearly wiped out across North America, peregrines have been increasing at Tahoe for several decades. See Tahoe In Depth, Issue #7 at

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Despite a half century of success, challenges to protecting Tahoe remain

By Tom Lotshaw
TAHOE IN DEPTH

The Tahoe Regional Planning Agency turns 50 in December.

Reflecting on that milestone and a new horizon of environmental and community challenges, TRPA leaders say Tahoe's greatest successes have — and always will — come from strong partnerships.

"We are all in it together, and we all need to be part of solutions for Lake Tahoe," said Joanne S. Marchetta, TRPA's longest-serving executive director, on the job since 2009.

Climate change is widely expected to be the greatest threat facing Tahoe this century, exacerbating environmental challenges that trace back to the decades before TRPA's creation in December 1969.

Logging in the late 1800s clear cut most of the Tahoe Basin. That left expansive forests to regrow thick with brush and overly dense stands of same-age trees far more susceptible to drought, insect attacks, and catastrophic wildfire.

Decades of rampant building and road construction damaged tributaries and displaced half of Tahoe's meadows and three-quarters of its wetlands, causing erosion and stormwater runoff to reduce the famously blue lake's clarity.

Tahoe's native Lahontan cutthroat trout was fished until gone, then replaced with non-native lake, rainbow, brook, and brown trout and kokanee salmon. Crayfish and Mysis shrimp were introduced to help sustain the new sport fishery — altering Tahoe's ecology in conjunction with other species that made it into the lake before modern-

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Protecting, Enjoying & Exploring the Lake Tahoe Basin

50 years of protecting Lake Tahoe

So what do TRPA, Woodstock, and the Apollo 11 moon landing have in common? 1969. It was quite a year.

Sitting here in 2019 with polarized politics an all-too-common reality, it's hard to imagine that two states came together some 50 years ago to save a national treasure. But that's exactly what happened. When renowned scientist Dr. Charles Goldman rang the alarm bells in the 1960s that something must be done to protect Lake Tahoe, people stood up and took action. The community rallied. Legislators in Nevada and California got busy. And two Governors made saving Lake Tahoe a priority. Former Nevada Senator and TRPA Governing Board Member Coe Swobe was fond of saying "(Governors) Reagan and Laxalt didn't want Lake Tahoe to turn gray on their watch." The legislation that passed both states and ultimately the U.S. Congress was signed into law by President Richard Nixon in December 1969. TRPA was born.

Lake Tahoe has evolved over the last 50 years and TRPA has learned much along the journey. We've moved from a command and control regulatory style to a collaborative approach where partnerships are paramount to preserving Lake Tahoe. I hope you enjoy taking a look back, as well as a look forward, in reading our cover story on TRPA's 50th anniversary.

During this special time of the year, we hope you enjoy Lake Tahoe's incredible holiday magic. Thank you for your support for *Tahoe In Depth*. And don't forget the paper makes a great stocking stuffer! Take a look at page 26 to see how you can give the gift of *Tahoe In Depth* this holiday season.

— Julie Regan, executive editor

Tahoe In Depth

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Spooner Lake upgrade

$3.2 million project will enhance recreation with visitor center and amphitheater

By Jay Howard
Nevada Tahoe Resource Team – Nevada Division of State Parks

Illustration: Nevada Division of State Parks
An artist's rendering of the new Visitor Center planned for Spooner Lake.

Change is on the horizon in Nevada at Spooner Lake.

The Spooner Lake Visitor Center and Amphitheater is a $3.2 million project to update and enhance park amenities at the Spooner Lake and Backcountry Management Area of Lake Tahoe Nevada State Park. Scheduled to break ground next year is a collaborative effort led by Nevada Division of State Parks through the Nevada Tahoe Resource Team. This multidisciplinary team is made up of Nevada's Division of State Lands, Division of Forestry, Division of State Parks, and Department of Wildlife. The Lake Tahoe Environmental Improvement Program partners, including the Tahoe Fund, are collaborating on the project.

The Spooner Lake and Backcountry Management Area represents an important recreational center for visitors from around the world and is a critical natural resource for Nevada. With more than 150,000 visitors every year, the area is a popular destination for hikers, mountain bikers, equestrians, and nature lovers. A host of major trail races and special events held at Spooner Lake each year take advantage of the excellent trail system and scenic views.

The project will enhance visitor access, parking, wayfinding, support services, and interpretive programs. The plan includes a large visitor center, consisting of a partially enclosed structure with an interpretive pavilion, gift shop, six single-stall restroom units, a convenience room with vending machines, audio/video and Wi-Fi/device charging stations, and a park office.

A separate amphitheater will provide a home for interpretive activities and allow park staff to enhance their interactions with the public. The site will get new landscaping, trail side amenities, and a pathway system with wayfinding that links to existing trails.

The existing facilities at Spooner Lake include an entrance station, restrooms, picnic area, and a group use pavilion. Most structures are over 35 years old.

The visitor center and amphitheater project will serve three major functions at Spooner Lake:

We are committed to increasing the interpretive programs sponsored by Nevada State Parks. The new amphitheater will further enhance our ability to host a variety of programs, and also increase the number of visitors that can attend.

— Allen Wooldridge
Lake Tahoe Nevada State Park Supervisor

- It will provide a place for interpretive programming, public outreach, and environmental education. The amphitheater will be used for a wide variety of natural and cultural history programs, ranger-led hikes and tours through the Spooner backcountry, and an outdoor science venue for schools. The new facility will reenergize a program of knowledge exchange between visitors, teachers, students, rangers, and guest speakers. Getting kids into the outdoors and allowing for moments of discovery is paramount to nurturing a lifelong love for the environment and an understanding of the need to protect important ecological resources. Leave No Trace and Tread Lightly programs will teach visitors how to leave a smaller footprint while enjoying the outdoors. Wayfinding is also a fundamental element for orientation and to keep visitors on designated trails and away from sensitive ecosystems.
- It will be the southern bookend for the Incline-to-Spooner section of the Tahoe East Shore Trail. The shared-use pathway is a multimillion-dollar project to connect existing sections of the bikeway around Lake Tahoe, with Nevada's commitment stretching from Crystal Bay in the north to Stateline in the south. Construction is now complete on the first 3 miles of the paved trail from Incline Village to Sand Harbor. The next 8-mile section, from Sand Harbor to Spooner Lake, is in the design and environmental-review phase. The visitor center and amphitheater will serve as a gathering spot and anchor for the southern end of this 8-mile East Shore Trail segment.
- It will serve as a major trailhead facility to over 60 miles of paths and trails in the backcountry of Lake Tahoe Nevada State Park. The Spooner backcountry has 13,000 acres of primitive wilderness, including North Canyon, Marlette Lake, Hobart Lake, Twin Lakes, Tunnel Creek, and the Franktown Creek area. The new visitor center will connect backcountry trails to the portion of the park that is an accessible, developed zone, providing recreation facilities to support backcountry activities. Some of the more popular trails in the park include the Marlette and Red House Flume

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Peregrine falcon nesting success at Castle Rock

Coalition, recreation groups ensure best outcome for important Lake Tahoe species

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tahoeindepth.org, to learn more about the history of peregrine falcons nesting at Lake Tahoe.

At Castle Rock, peregrine falcon nesting was first observed in 2011. The birds raised two young that year. The next year, the birds moved their nest to a different location on the cliff, where from 2013 to 2015, they fledged one to three nestlings per year. In 2016, the nest site was active in the beginning of the season, but biologists were unable to determine whether the nesting pair had produced any young.

In the fall of 2016, Stephanie Coppeto and Shay Zanetti, wildlife biologists with the USDA Forest Service Lake Tahoe Basin Management Unit (LTBMU), learned of new rock climbing routes on National Forest lands at Castle Rock near the nest site. These routes were well-publicized and easy to access. Concerned that increased recreational disturbance might affect these birds, Coppeto and Zanetti asked Lake Tahoe's Biology Interagency Group, a network of agency and nongovernmental biologists, to discuss various courses of action.

When peregrine falcons were on the federal endangered species list, land managers would close down entire cliffs to rock climbing during the breeding season from April to August. Some climbers did not comply with the closure, and the length of closure was often more than what the birds needed. Biologists learned the birds have wide variances in their tolerance of nearby human activity; some habituate to consistent patterns of human activity, but others do not.

Agencies began lifting closures as soon as the birds had fledged — a successful strategy used at Yosemite National Park and at Black Wall on Donner Summit.

Although complete closure of the climbing area was an option based on the peregrine's status as a "special-interest species" with the Tahoe Regional Planning Agency, the Biology Interagency Group decided that data were needed to make informed decisions regarding potential route closures.

Beginning in mid-March 2017, biologists from NDOW, LTBMU, TINS, TRPA, and Sierra Ecotone Solutions monitored the nest site while noting numbers and locations of hikers, climbers, and dogs and paying careful attention to the falcons' behaviors. The climbers who set the routes also did not want to disturb the birds and volunteered to collaborate with the biologists.

Photo: Mark Enders, Nevada Department of Wildlife

A peregrine falcon (above) near its nest on Castle Rock. A fledgling falcon (below) at feeding time outside the nest.

The 2017 season started out promising. The pair of falcons set up their territory at Castle Rock, vocalizing and interacting in the skies and perching at the nest site. By mid-April, the pair seemed to be incubating eggs. But falcon activity trailed off, and by mid-June the biologists believed the nest had failed. The same thing happened in 2018.

Biologists noticed that the birds were seldom perturbed by climber activity but were visibly upset by hikers. A trail leads to a notch between twin summits on Castle Rock, and hikers often scramble

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Stories told through snow crystals

Citizen scientists use smartphones to collect startling variety of snowflake shapes

By Kelsey Fitzgerald
Desert Research Institute

When most people envision a snowflake, they think of a classic, six-armed snow crystal with finely branched edges. But the diversity of snow crystals worldwide — and here in the Sierra Nevada — is astounding.

"We've been getting snow crystals of all types —everything from radiating plates, which look like the petals of a flower, to capped columns, which look like tiny little spools of thread," said Meghan Collins, education lead for the Desert Research Institute's Stories in the Snow program. "Rosettes, composed of tiny bunches of ice crystals that connect at a center point, were also common."

For the last three winters, Collins and her colleagues with Stories in the Snow have been collecting images of freshly fallen snowflakes from local citizen scientists, who snap the photos using a smartphone and a special magnifying lens. Participants send their images and data to the research team via the Citizen Science Tahoe app.

With a growing database of more than 1,200 closeup snowflake photographs, the Stories in the Snow team is now working to decipher what each of these tiny flakes can tell us about winter storms in the Reno-Tahoe region. They're learning that these snowflakes have fascinating stories to tell.

"We have been able to see in our snow crystal database that different storms produce different types of snow crystals," Collins said. "An atmospheric river, for example, produces different types of snowflakes than a colder 'inside slider' storm that moves down from the north."

Project researchers look for tiny frozen water droplets called 'rime.' This indicates that there was a pocket of extra moisture in the cloud where the snowflake formed — something that can usually only be observed from an airplane.

"The only other way to know if rime is present is through pilot reports, but there aren't always planes flying through snowstorms, so these snowflake images are providing valuable information," Collins said.

Researchers are using the snowflake data to examine the impacts of warmer winters and implications for western water supply. This year, the Stories in the Snow team hopes to explore any connections between snowflake shape and avalanches.

Photo: Desert Research Institute
Meghan Collins, assistant research scientist of environmental science at DRI, demonstrates the use of a Stories in the Snow data collection kit.

"We are in the exploratory stages, but we are interested in learning about the strata of snow as snowpack builds throughout a storm, and whether certain crystal types lead to the formation of a weak layer that might contribute to an avalanche," Collins said.

During the project's first two seasons, the Stories in the Snow team worked primarily with school groups, organizing teachers and students to collect snowflake images from around their schools and homes during snowstorms. To learn about possible connections with avalanches, however, the team is now looking for additional help from skiers and other winter sports enthusiasts who spend time on some of the Tahoe Basin's more challenging terrain.

"We have a call to action for citizen scientists," Collins said. "We are looking for passionate people who spend time in the backcountry and who can get crystals from hard to reach places."

They are looking for people who visit high elevation sites and backcountry sites where avalanches occur. They are also looking for people who can commit to submitting snow crystal images at regular time intervals throughout a storm – every half-hour for three or four hours, for example. This will help them learn about changes in snowflake shape that occur during the course of a storm.

If you'd like to join in the fun and snap some snowflake images yourself, there are several ways to get involved. Thanks

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Stream Profile Chamber celebrates 50 years

Repaired and still popular, Taylor Creek facility raises awareness of Tahoe's environment

by Jennifer Hebert
USDA Forest Service

Photo: Jennifer Miller
Spawning kokanee salmon as seen from the Stream Profile Chamber.

July 27, 2019 marked the 50th anniversary of the Stream Profile Chamber at Taylor Creek Visitor Center in South Lake Tahoe.

The facility allows visitors an underwater view of Taylor Creek and its aquatic inhabitants, and since 1989, its popularity increased five-fold, from 80,000 annual visitors to over 400,000 in recent years.

"The Stream Profile Chamber at Taylor Creek is one of our most beloved facilities and receives visitors from across the nation and around the world," said Jeff Marsolais, forest supervisor with the USDA Forest Service Lake Tahoe Basin Management Unit. "Through shared stewardship and innovative partnerships, this amazing underwater facility will continue to connect visitors with their public lands."

When it was built in 1969, the Stream Profile Chamber represented a management shift taking place within the Forest Service to increase the value of recreation resources. The Multiple Use-Sustained Yield Act of 1960 directed the secretary of agriculture to "develop and administer the renewable resources of timber, range, water, recreation, and wildlife on the National Forests for multiple use and sustained yield of the products and services." This was the first law to place these major uses on equal footing, with no one use — such as commercial timber sales — given preference. The Taylor Creek Visitor Center provided an opportunity to promote the new act and to teach the public about Lake Tahoe's unique and precious resources.

The idea for the Rainbow Trail and Stream Profile Chamber was developed under the guidance of Robert K. Morris, an interpretive specialist for the Eldorado National Forest. Morris imagined a coordinated exhibit in which the Rainbow Trail and Stream Profile Chamber told one complete story. Morris passed away during planning and design, however, and his team struggled to complete his vision. Temporary interpretive materials were installed as a placeholder, but they remained in place for 25 years. Despite this, the Stream Profile Chamber and the Rainbow Trail proved popular, delighting families and classrooms of young students.

In the mid-1990s, the facilities received a makeover, including contemporary signage and a new mural on the walls of the chamber depicting four seasons of life in and around Taylor Creek. The redesign incorporated a new viewing window extending from floor to ceiling, providing better visual access to small children and guests using wheelchairs.

In 2018, during a routine cleaning, one of the glass panels shattered, closing operations for the season. With limited funding available for such an expensive repair, the Forest Service feared an indefinite closure of the treasured amenity.

"The Stream Profile Chamber is central to the visitor experience at Taylor Creek, and we all were concerned about the public's response to the indefinite closure," said Jerry Keir, executive director of the Great Basin Institute, an interpretive association for the facility.

> *"Through shared stewardship and innovative partnerships, this amazing underwater facility will continue to connect visitors with their public lands."*
>
> **Jeff Marsolais, forest supervisor**
> *USDA Forest Service, LTBMU*

Keir reached out to community partners, and with financial assistance from the Tahoe Fund and Tahoe Blue Vodka, the facility was repaired and the Stream Profile Chamber reopened its doors in June 2019.

During the operating season, an average of 2,500 guests a day visit the profile chamber, making it a critical element in raising public awareness of environmental issues and human impacts in the Lake Tahoe Basin.

The facility at Taylor Creek may be 50 years old, but its lessons are more important than ever.

Jennifer Hebert is a landscape architect and presidential management fellow with the USDA Forest Service.

Basin sees butterfly bonanza

Swarms of tortoiseshell butterflies make mass migration to Lake Tahoe and Sierra Nevada

By Kathryn Reed
Special to Tahoe In Depth

Photo: Matt Forister
Swarms of tortoiseshell butterflies were seen this summer at Tahoe and in the Sierra, including these at Castle Peak.

An explosion of butterflies in the Lake Tahoe Basin in summer 2019 had social media abuzz, locals and tourists wondering what this might mean, and scientists busy collecting data.

Swarms of these orange-and-black insects were seen in various locations in and around the Tahoe area. California tortoiseshell butterflies, or torties to those who study them, are often confused with the better-known monarchs due to their common coloring. Tortoiseshells have orange wings, with black spots near the top, and black along the wing edges. The underbelly is usually brown or gray, with no distinguishing characteristics.

Tortoiseshell butterflies are smaller than monarchs, with a wingspan averaging 2 inches. In California, they cover a smaller geographic area than their better-known cousins. Torties tend to migrate between the foothills and mountains. While many were seen at lake level in July and August, they were also at higher elevations, with hikers along the Pacific Crest Trail and John Muir Trail reporting swarms.

The last documented population boom in the Tahoe area was at Mount Rose in 2005.

"It is a native species. They go through historic episodes of these mass migrations like (we were) seeing this year," Danny Cluck of the USDA Forest Service said. Cluck is a forest entomologist with Forest Health Protection of Northeastern California, which is a branch of the Forest Service. "I've probably seen four of them in the last 20 years."

What scientists don't know is why the population bursts occur, when they will occur, or where. While these butterflies can be found other places, the population booms tend to be in California. Still, the population spurts are not a new sensation. The Cooper Ornithological Society reported a swarm in the early 1900s.

Art Shapiro, distinguished professor of evolution and ecology at UC Davis, has been collecting data on tortoiseshell butterflies for 48 years. He helped to establish 11 study sites, with one at Donner Pass, another at Castle Peak, and one in the Sierra Valley north of Truckee. More than 150 insect species are being studied at these sites. In the summer, during the height of butterfly season, scientists are at the stations regularly.

"The point of monitoring the entire butterfly faunas is to try to extract information on the biological and ecological effects of climate change," Shapiro said. "We are getting information on species moving upslope as climate warms. Most species are not eruptive like the tortoiseshells, but all have population dynamics, so a lot of information can be gained."

Matt Forister, a professor of biology at the University of Nevada, Reno, worked for Shapiro 22 years ago and is now taking over some of the study sites. There is talk of adding a high-elevation study spot because of climate change.

"They are fascinating and complicated when it comes to climate change," Forister said of all insects.

Each year two generations of tortoiseshells are born, starting at the lower elevation. In June, they migrate to higher elevations, where more are born. The ones that emerge in late summer will breed the following summer. They go south and to a lower elevation in winter.

"What we don't understand is why and where they breed in any given year. They almost never breed in the same place in successive years," Shapiro explained. "Because they are so mobile, they have the option to breed in any of the higher elevations in California or up to the Pacific Northwest and into Idaho."

The insects have been seen on the East Coast, but nowhere near the numbers they are in parts of the West. Two breeds that are extremely similar have been located in Europe as well.

Besides seeing the abundance of butterflies, people may notice foliage being wiped out when the insects are in the caterpillar stage.

"(A swarm) is not harmful unless you are one of their host plants that can be devoured in total. That is part of life. Caterpillars eat plants," Forister said.

The caterpillars feed on ceanothus, better known as wild lilac, tobacco brush, and snowbrush. While the plants may appear to be defoliated, the feeding frenzy doesn't kill the brush.

"The result of big wildfires in the last 20 years is that there is a lot more brush," Cluck said. "This provides many more acres of habitat for these insects. If they were an insect that ate trees and caused economic damage, we would know everything about them. But they do not have a big environmental impact. Thus, there is not a lot of information out there."

California's most recent drought

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Tortoiseshell butterflies make a colorful appearance

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affected the tortoiseshells.

"During the five-year drought that ended three years ago, there were virtually none in the area of my transect," Shapiro said. "They disappeared from this area. There were some near Vacaville. They didn't breed there at all for three to four years. We don't really know where they were, but they survived the drought somewhere."

Forister said, "We know butterflies in the mountains are becoming less common because of drought years. This year's (burst) shows some butterflies have the capacity to rebound. It tells us nothing beyond that."

The abundance of chaparral in many locations provides food for the tortoiseshells. They also consume nectar from a variety of plants.

Water and salt are two other needs of these insects. They feast on overripe fruit like honeydew, as well. Torties can get nutrients out of mud, which is also a source of salt.

"They are people friendly. They love to perch around people's heads and drink your sweat," Shapiro said.

This could be the reason so many butterflies were seen on tennis courts during the summer — a lot of sweaty bodies to feast on.

Kathryn Reed is a freelance writer.

Tortoiseshell butterfly facts:

- Wingspan is 1.25 to 2.75 inches.
- Females and males have the same coloring.
- They are part of the Nymphalidae family.

Art Shapiro of UC Davis has more information online: http://butterfly.ucdavis.edu/butterfly/Nymphalis/californica

Photo: Matt Forister

Scientists are still trying to figure out why tortoiseshell butterflies have population booms.

Spooner Lake Visitor Center first phase of larger project

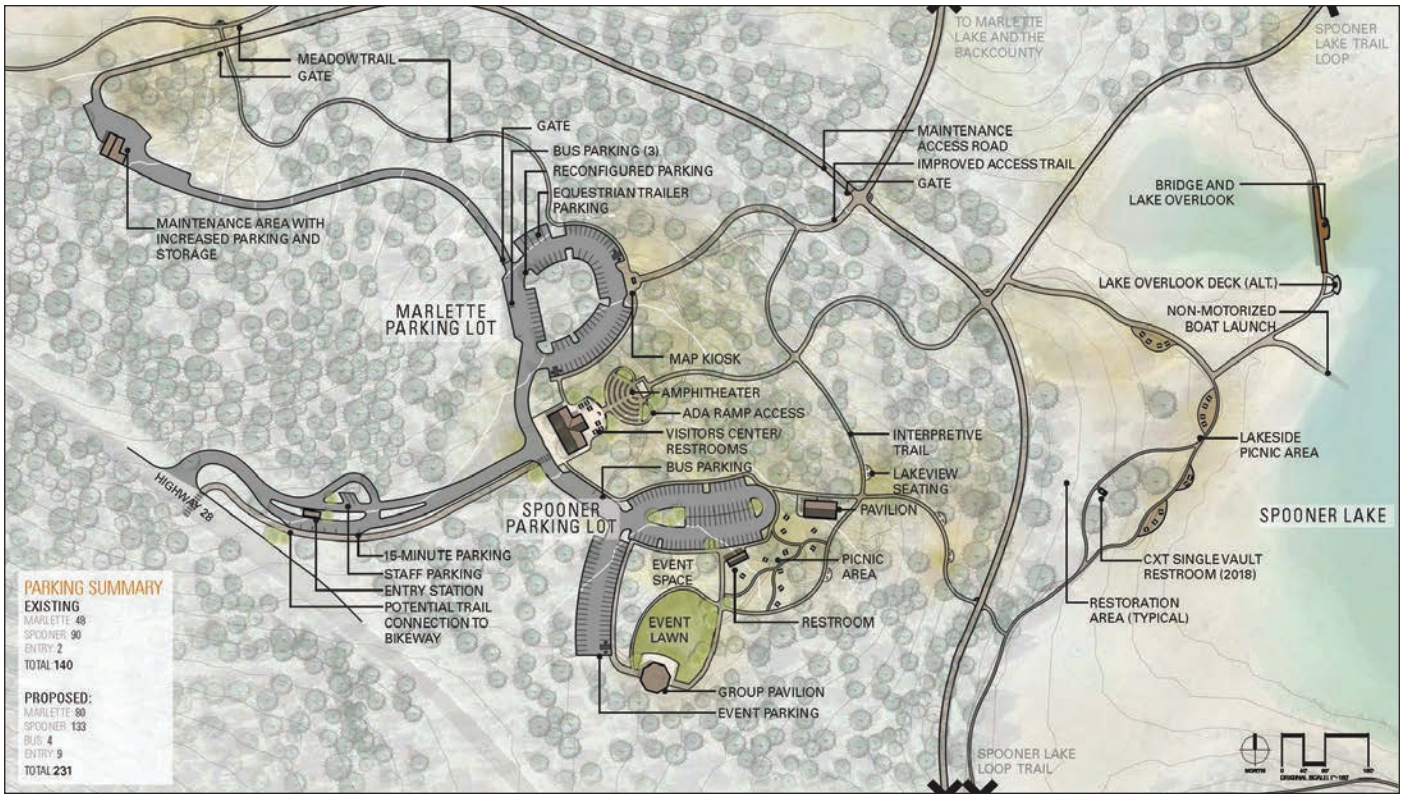
Continued from page 3

Trails, Tahoe Rim Trail, Marlette Lake Trail, Sunflower Hill Trail, and Spooner Loop Trail. Outside trail systems that are connected to the park trails include the Incline Flume Trail, Marlette Creek Trail, Ash to Kings Canyon Trail, Ophir Creek Trail, and the planned Capital to Tahoe Trail. The visitor center will act as a portal to these regional trails, and a central gathering point for visitors embarking on outdoor adventures.

The Spooner Lake Visitor Center and Amphitheater project is the first phase of a larger Spooner Front Country Improvements Project, which includes accessible trails and pathways, additional restrooms, redesigned parking lots (with over 200 parking spaces), a group-use ramada with space for special events, picnic nodes, a wildlife viewing platform and fishing pier, and a nonmotorized boat launch ramp.

A recent Outdoor Industry Association study found that outdoor recreation generates $12.6 million for Nevada's economy and supports over 87,000 jobs.

Nevada is searching for additional funding for this project with help from the Tahoe Fund. The Tahoe Fund is seeking donations to support the construction of the amphitheatre, which includes naming rights for a $100,000 donation to the project. For information on project donations and funding opportunities, visit the Tahoe Fund's website at: https://www.tahoefund.org/projects/active-projects/spooner-lake-amphitheater/



Jay Howard is the Environmental Improvement Program's recreation coordinator for the Nevada Tahoe Resource Team – Nevada Division of State Parks.

Injured animals get a second chance

Nonprofit Lake Tahoe Wildlife Care moves into new facility; further improvements planned

By Morgan Beryl
TAHOE IN DEPTH

Have you ever seen six raccoons sleeping in a hammock, all cuddled together, or playing with toys as toddlers might?

You probably have if you volunteer for Lake Tahoe Wildlife Care.

Raccoons are one of many kinds of injured and orphaned wild animals Wildlife Care volunteers nurse back to health and release into the wild. On any day, a volunteer could be caring for woodpeckers, songbirds, hawks, bears, beavers, foxes, or bobcats.

Tom and Cheryl Millham founded Lake Tahoe Wildlife Care in 1978, using their South Lake Tahoe home and backyard to give injured and orphaned animals a helping hand and a second chance at life in the wild.

From those first few songbirds and chipmunks, the organization has cared for more than 26,000 animals, and successfully rescued, rehabilitated, and released more than 18,000 back into the wild.

Photo: Lake Tahoe Wildlife Care
A group of injured raccoons make use of a a climbing and bedding structure at Lake Tahoe Wildlife Care.

Over 12 counties served

Lake Tahoe Wildlife Care now provides wildlife rehabilitation services for a dozen counties surrounding Lake Tahoe. It operates with permits from state and federal wildlife agencies and is the only facility in Northern California permitted to rehabilitate bear cubs.

This year, a lot of ducklings have been coming in.

"This was the year of the duck. Boy have we had to care for a lot of ducks this year," said Denise Upton, a 20-year volunteer now working as animal care director for organization. "But we take in many species of injured or orphaned wildlife. This year, our volunteers helped raise four orphaned bear cubs."

Over one season, LTWC may care for as many as 12 different species, including ospreys, weasels, chipmunks, owls, or eagles. Some animals have a short stay and are back in the wild in no time. Others may not be able to reenter the wild because of their severe injuries.

Em, a bald eagle who will never fly well enough to survive in the wild because of a past injury, is one of Lake Tahoe Wildlife Care's long-term sanctuary animals and now serves as an education ambassador at community events.

> *"We would not be where we are today without our founders, volunteers, donors, and the animals and birds who need our help and win over everyone's heart."*
>
> **Morgan Amsden, board president**
> *Lake Tahoe Wildlife Care*

Special raptor team

Em has a special team of Lake Tahoe Wildlife Care volunteers trained to care for raptors, and he gets a nice big fish for breakfast and another for dinner.

Back in 1978, the Millhams knew there was a gap in Tahoe's animal care community. But they never expected Lake Tahoe Wildlife Care to grow to what it is today. Tom Millham looks back over the decades with pride.

"Senior volunteers, and our board members have trained more than 2,500 volunteers and we have 100 active volunteers who help rescue and feed the animals and clean our facilities. If you've ever seen a racoon cage, you know there is a lot to clean."

There will soon be even more cleaning and feeding to do as Lake Tahoe Wildlife Care continues to grow. From a backyard outfit to a staffed nonprofit, Lake Tahoe Wildlife Care is increasing its budget and building a state-of-the-art facility in South Lake Tahoe.

New facility

"It's been a huge lift," said Morgan Amsden, board president for the organization. "We've been planning this move for a long time, working to purchase the property and to further develop the organization. We've been applying for grants and have been graciously supported by many donors who believe in our mission."

Lake Tahoe Wildlife Care finished the first phase of its new facility on Al Tahoe Boulevard and moved in this fall.

The facility provides more amenities for the wildlife, including heated cages for hibernating bears made possible through a grant by Lisa Maloff. With help from Bently Foundation, there is a permanent flight area for raptors, with four large indoor spaces and two larger outdoor spaces. Almost all cages now have outdoor areas for the animals, which helps their rehabilitation.

"Some animals come to us so young, it's really important that they learn what outside feels, sounds, and smells like," Upton said.

Improving medical care is another major focus. Lake Tahoe Wildlife Care's volunteer vet, Kevin Willitts, is on call to help injured wildlife.

A grant from the Tahoe League of Charity helped Lake Tahoe Wildlife Care purchase medical supplies to provide more immediate care to rescued wildlife. The organization is now working to purchase an expensive, but invaluable, mobile X-ray machine to quickly diagnose animal injuries.

"We would not be where we are today without our founders, our volunteers, our donors, and the animals and birds who need our help and win over everyone's heart." Amsden said.

Over the next few years, Lake Tahoe Wildlife Care will work to fully fund its vision for the Al Tahoe Boulevard facility, which includes a rehabilitation building and more opportunities for the public to learn about and experience Tahoe's wildlife.

Through the support of the Tahoe Fund, Tahoe Blue Vodka, and the Mathman family, an outdoor learning area will be built to host educational seminars with Em and Lake Tahoe Wildlife Care's other animal ambassadors.

Lake Tahoe Wildlife Care is always looking for more folks to help. There's no shortage of ways to get involved, from feeding rascally racoons to lending financial support. Visit ltwc.org.

If 2019 was the year of the duck, what does 2020 hold, and how can we continue to work together to help our wildlife in need?

Morgan Beryl is a Lake Tahoe Wildlife Center board member.

Photo: Chris Larson, Tahoe Regional Planning Agency
Rafters enjoy a quiet stretch of the restored Upper Truckee River.

TRPA recognizes the Best in Basin

Agency honors eight projects for environmental, community benefits

By Chris Larson
Tahoe Regional Planning Agency

In December, TRPA recognized eight projects completed in 2018 with Best in Basin awards.

The winning projects completed new mountain trails and a new path on Tahoe's West Shore, protected the lake from invasive plants, restored meadows and a portion of the Upper Truckee River, and tackled erosion issues.

Now in its 29th year, TRPA's annual Best in Basin awards spotlight projects with high levels of planning and implementation that benefit Lake Tahoe's environment and its communities. Below are highlights from this year's winners.

Incline Flume Trail

Thanks to public and private partnerships, this family-friendly backcountry trail is complete and accessible to nearly all abilities. The project began with the USDA Forest Service officially adopting the trail, which allowed local groups to make significant improvements. The Tahoe Fund provided early funding of $30,000, and the Friends of Incline Trails provided more than 1,500 volunteer hours. This, combined with professional work crews from the Forest Service and American Conservation Corp, made the trail possible. The Incline Flume Trail starts just off the Mount Rose Highway and across to Tunnel Creek Road.

Photo: Chris Larson, Tahoe Regional Planning Agency
A pair of cyclists pause while using a portion of the new Meeks Bay Trail on the West Shore of Lake Tahoe.

Meeks Bay Trail Project

A little more than three-quarters of a mile long, this Class 1 multi-use path is a major addition to the West Shore trail system. The trail links two significant recreational centers on Tahoe's West Shore — Sugar Pine Point State Park southward to the entrance of Meeks Bay Resort. The pathway parallels Highway 89, and significant engineering hurdles were overcome while constructing the trail. The path was constructed in just one

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Photo: Chris Larson, Tahoe Regional Planning Agency
A cyclist heads out for a ride on the Incline Flume Trail.

Continued from page 10

season and within existing Forest Service and Caltrans rights of way. Seventy percent of the project required retaining walls, as well as the construction of a large bridge. Central Federal Lands Division of the Federal Highway Administration was the lead agency on this project.

Restoration of Fire-Adapted Ecosystems

There are approximately 4,700 acres of meadow in the Lake Tahoe Basin, and the Forest Service manages 2,700 acres.

In 2018, the Forest Service completed restoration of Baldwin Meadow. Nearly all trees were removed from the meadow and perimeter trees were thinned. Additional restoration tools included willow planting, channel repair, and rerouting trails. Forest Service crews also completed a controlled burn of the meadow. Meadow restoration will allow the land to adapt to future conditions brought on by climate change.

Tahoe Keys Bubble Curtain

Invasive plants like Eurasian watermilfoil and curlyleaf pondweed have been growing out of control in the Tahoe Keys for years now, and their proliferation has threatened to spread into Lake Tahoe proper. The Tahoe Keys Property Owners Association and the League to Save Lake Tahoe teamed up with experts from Canada to create an underwater "bubble curtain."

Photo: Chris Larson, Tahoe Regional Planning Agency
The bubble curtain in the Tahoe Keys is helping prevent invasive plants from reaching the lake.

An underwater hose emits a strong current of bubbles that keeps plant fragments from escaping into Lake Tahoe.

The V-shaped hose pushes plant fragments to the outer walls of the channel, where they are collected every afternoon. The goal of the project is to contain invasive plants while scientists look for a long-term solution to control the infestation.

Upper Truckee River Reach Restoration Project

Restoration along the Upper Truckee River culminates seven years of planning by the USDA Forest Service Lake Tahoe Basin Management Unit and the California Tahoe Conservancy. Crews began staging for the project in 2012, and channel construction continued from 2013 to 2016. From 2017–2018, crews completed the adaptive management and stabilization phase. The project restored 120 acres and required the rechanneling of 7,340 feet of the Upper Truckee River. The new channel improves aquatic habitat and increases channel and floodplain connectivity while reducing streambank erosion. The Upper Truckee is the only river in the Tahoe Basin known to contain the native Western pearlshell mussel. Ultimately, 25,000 mussels were relocated by crews from the California Conservation Corps, the Generation Green program, and members of the Youth Conservation Corps.

Country Club Heights Erosion Control Project

The El Dorado County Department of Transportation tackled runoff and erosion issues in the Country Club Heights area between Meadow Vale Drive and Elks Point Drive. Runoff and erosion were a persistent problem along Boca Raton Drive because of inadequate infrastructure. New improvements include curb and gutter, sediment traps, and infiltration basins, which allow for the rewetting of the existing meadow system. The meadow now does its proper job of spreading and infiltrating stormwater runoff. This project is an outstanding example of using hardscape and natural systems to capture and treat stormwater runoff.

Tahoe facing housing crunch

New studies document how nearly half of households are 'cost burdened'

By Allison Kerley and Karen Fink
Tahoe Regional Planning Agency

"House is old and run down but that's why the rent is low. If it was nice and fixed up the rent would double, and I wouldn't be able to afford it."

"It's a rental. I can't afford to own a home in town and rentals come with the constant fear of being kicked out and poor maintenance."

"Living in a van."

"A 22-year old with a good full-time job shouldn't have to have five roommates or live with his parents to be able to survive in this town."

"Mice."

— Experiences shared by respondents to Housing Needs Assessment surveys conducted in South Shore communities, July–August 2019.

A large percentage of residents face challenges in finding, keeping, or affording decent and safe housing at Lake Tahoe. Over 40 percent of households around Lake Tahoe are "cost burdened," spending 30 percent or more of their monthly income on housing costs.

Several recent studies have shed light on the scale of the issue at Lake Tahoe. According to the South Shore Housing Needs Assessment (2019), the Truckee-North Tahoe Regional Workforce Housing Needs Assessment (2016), and Placer County, more than 5,000 homes are needed in the South Shore and the Tahoe portion of Placer County to meet workforce housing gaps. This estimate encompasses housing that addresses the shortage of workers, overcrowding, and some, but not all, commuters who would prefer to live at Tahoe. The need crosses the wage-earning spectrum, from service-industry workers to teachers, police officers, firefighters, and management-level professionals.

How are governments, employers, and citizens dealing with these issues? How can Tahoe provide enough housing for workers while balancing visitation that employs those workers?

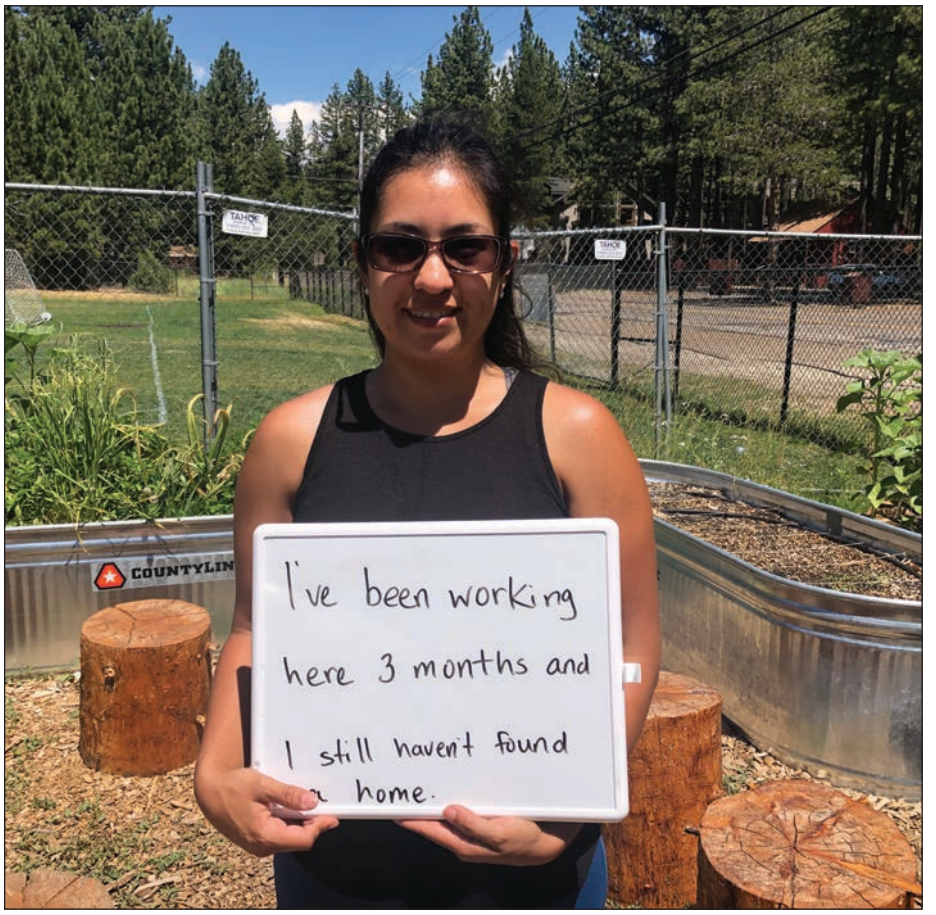

Photo: Tahoe Regional Planning Agency
A housing needs assessment survey conducted in South Shore communities in summer 2019 found that many Tahoe residents struggle to find acceptable housing.

Implementing new projects

Actions are underway to create new homes, particularly on the North Shore.

- The Tahoe City Marina apartments opened this year, providing eight moderate-income homes and two market-rate rental units for those who live in the area full-time.
- The Kings Beach Voltex project will begin construction next year, providing five employee housing units.
- "The Vision" at Tahoe Vista is approved and will provide three employee housing units.
- Placer County recently purchased approximately 11 acres on Dollar Hill near Tahoe City for an achievable housing project.

The South Shore does not have any new local housing projects approved; however, the Tahoe Transportation District, City of South Lake Tahoe, and California Tahoe Conservancy have begun discussions with developers on several parcels.

The Town of Truckee has approved 395 new units, the vast majority of which provide deed-restricted low- to moderate-income housing.

Helping get families into homes

Saint Joseph Community Land Trust offers no-interest loans to help move families out of motels and into homes. Motels are not considered adequate housing, but many families struggle to come up with first and last month's rent for a home rental, which traps them in motels. Since its inception in 2018, the Motel to Housing Program has moved 33 school-aged children and their families out of motels or other substandard housing. The Land Trust has also secured the "first right of refusal" on two parcels in South Lake Tahoe and is working to find financing to construct three to five homes on these lots.

Connecting renters and homeowners

Tahoe Home Connection on the South Shore and Landing in the North Shore-Truckee area encourage willing second homeowners to rent their underutilized homes to residents either seasonally or long-term. Both organizations worked with their respective city and county governments to survey second homeowners. Nearly 400 respondents to these surveys indicated that they would be interested in renting their home to a local resident. The work of the two organizations has helped match over 40 locals with 20 homes.

Changing regulations

Another housing issue receiving attention is the use of homes for short-term rental purposes. As the online short-term rental industry has exploded with Airbnb and VRBO, communities around the world have been struggling to adapt. After consultation with neighborhood groups, real estate agents, the construction industry, and local governments, the Tahoe Regional Planning Agency passed a code amendment to incentivize local governments to upgrade their operations, enforcement, and location of short-term rentals.

Another TRPA initiative to help residents purchase a home for their own use is the ability to deed-restrict a home as affordable, moderate, or achievable. Once deed-restricted, the homeowner receives a "bonus unit" to develop a home on the property. The homeowner can then sell off the existing residential unit of use on the open market. For more information, visit trpa.org/permitting/housing.

Work at the state and local levels

The California Legislature is addressing the housing shortage through a variety of methods, including bond funding and updating rules for Accessory Dwelling Units, also known as ADUs or granny flats. New bills require that local jurisdictions allow up to two ADUs on a parcel, with some exceptions, as long as the units meet height, setback, and other parcel-level requirements. The legislation also eliminates impact fees for ADUs under 750 square feet, which can decrease costs of building an ADU by about $15,000. Local jurisdictions and TRPA are working to adapt these rules to the Tahoe Basin.

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Resort town planners, officials meet at Tahoe

Mountain communities' leaders share ideas for tackling common challenges

By Devin Middlebrook
Tahoe Regional Planning Agency

Photos: Tahoe Regional Planning Agency
Planners from throughout the U.S. and Canada came to Tahoe for the annual Mountain and Resort Town Planners Summit.

Nearly 140 planners, elected officials, consultants, advocates, researchers, and nonprofits from over 30 communities came to South Lake Tahoe in October for the annual Mountain and Resort Town Planners Summit.

This annual event brings together dozens of communities from the United States and Canada to explore shared challenges and solutions.

Joanne Marchetta, executive director of the Tahoe Regional Planning Agency, kicked off the annual event by highlighting the complex history of Lake Tahoe and what's been done to preserve its environment. She urged attendees to think of their community's future over the next 50 years regarding the issues of economic inequality, equity, inclusiveness, sustainable recreation, vacation home rentals, affordable housing, and growing tourism demand.

Later in the conference, participants examined such issues as transportation, growth management, community well-being, and housing. Speakers from across the country shared success stories, such as the world-class transit system in Park City, Utah; greatly reduced bear-human conflicts in Canmore, Alberta, Canada; innovative local housing projects in Truckee; a keystone performing arts venue in Avon, Colorado; and Aspen, Colorado's efforts toward a climate-ready future.

Local Olympic skier Maddie Bowman shared her experience as a professional skier and the impacts of climate change on her sport. She described visiting different mountain communities, noting the importance of a good public transportation system.

The summit offered Tahoe leaders the opportunity to share some of the basin's successes and challenges. During the event, participants explored the South Shore and visited places like Van-Sickle Bi-State Park, which highlights sustainable recreation; Lakeside Beach, which spotlighted the collaborative planning process that led to updated shoreline regulations at Lake Tahoe; Heavenly Village to view the redevelopment projects that transformed the tourist core; and Nevada Beach, where they heard about the history of environmental conservation at Tahoe.

The biggest takeaway was that mountain and resort communities' problems are shared, and the solutions to solve them must be creative. Although these communities are working in the 21st century with new technology, growing populations, and a changing climate, governments and local systems are still operating in the 20th century. Shifts in how mountain communities operate and measure success will be needed in the future.

To learn more about the Mountain and Resort Town Planners Summit please visit www.mountainplanners.org.

Devin Middlebrook is the sustainability program manager for TRPA.

Local governments at Tahoe taking steps to ease housing problem

Continued from page 12

Nevada produced several key housing bills in its 2019 legislative session. Local governments can now reduce certain fees for affordable housing, and the state may issue new tax credits to help finance affordable housing. The legislature also passed new renter protections, such as giving renters a longer grace period to correct a notice of overdue rent.

Local jurisdictions are building on state housing initiatives and taking advantage of housing planning grants available at the state level. The City of South Lake Tahoe, El Dorado County, and Placer County are using a state grant to develop ADU and multifamily code updates and develop objective design guidelines to help streamline project approvals. The city is conducting a Housing Conditions Survey to update data from a 2002 survey. The city also maintains a bilingual housing hotline to assist tenants dealing with substandard housing issues that landlords are not addressing. Placer County is amending its area plan to encourage more employee and multifamily housing. Washoe County is developing a countywide ordinance to address short-term vacation rentals.

Call to action

Many of the challenges of providing housing are large-scale and must be handled with partnerships beyond the Tahoe Region. Construction, labor, and land costs are approximately 60–70 percent of the total cost of building a home. As a result, most new development is skewed toward larger, more expensive homes to absorb the costs associated with purchasing land, obtaining permits, and building the home.

The region must consider a variety of strategies, from updating policies to finding ways to lower construction and land costs. We need to become resilient and flexible as technology and the market drive changes at a rapid clip. As we incorporate adaptability into our systems, we will create a range of housing choices to accommodate the needs of residents and their families as they change and grow.

Allison Kerley is an intern in TRPA's Research and Analysis Department. Karen Fink is the TRPA's housing program coordinator.

Get involved:

Mountain Housing Council: www.mountainhousingcouncil.org

Tahoe Prosperity Center: www.tahoeprosperity.org

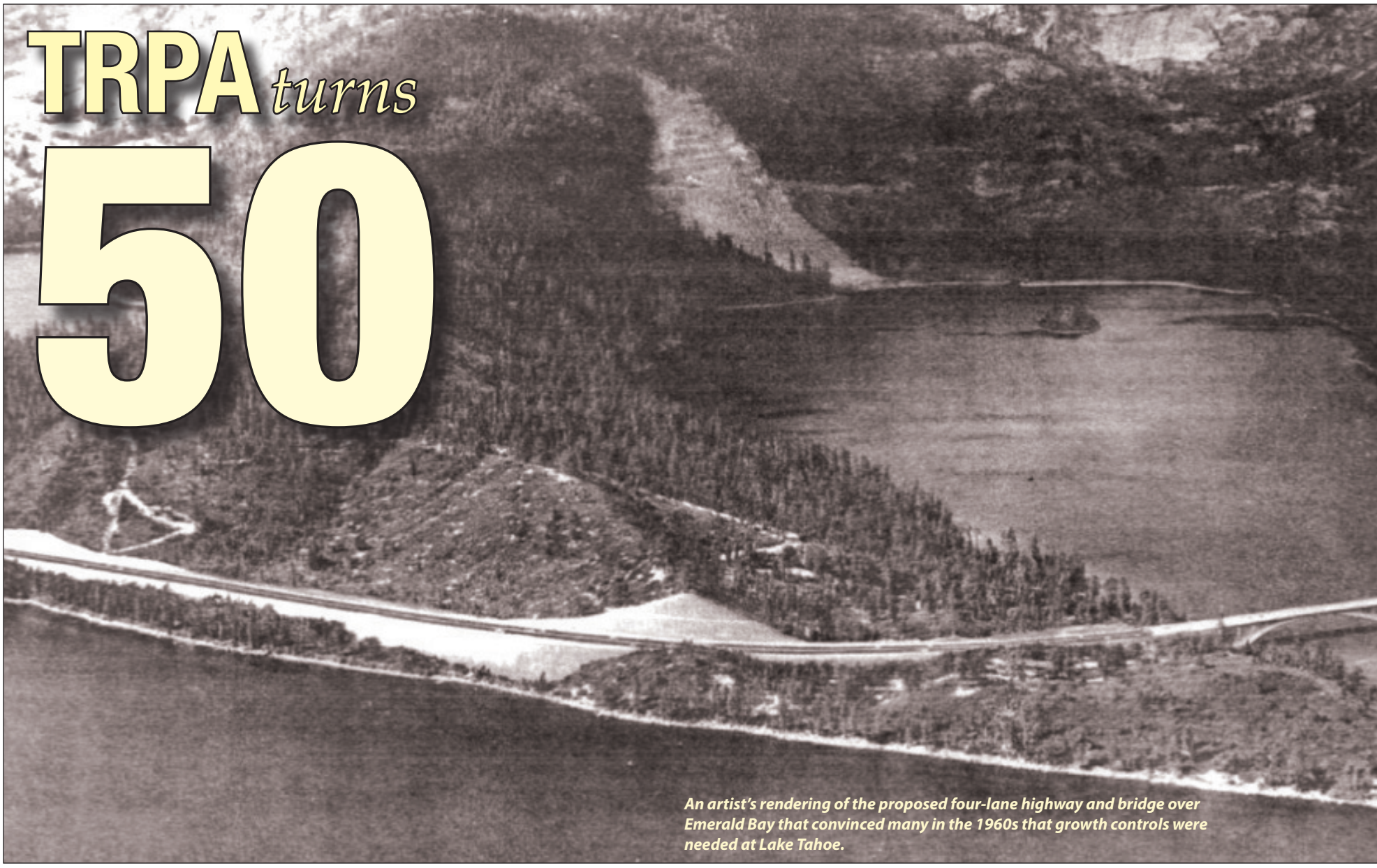
Tahoe Coalition for the Homeless: www.tahoehomeless.org

Saint Joseph Community Land Trust: www.saintjosephclt.org

Tahoe Home Connection: www.tahoehomeconnection.com

Landing: www.uselanding.com

TRPA *turns* 50



An artist's rendering of the proposed four-lane highway and bridge over Emerald Bay that convinced many in the 1960s that growth controls were needed at Lake Tahoe.

TRPA promoted partnerships, collaboration to 'get the work done'

Continued from page 1

day programs that prevent and control aquatic invasive species.

The Winter Olympics at Squaw Valley in 1960 showcased Tahoe's growing resorts as a world-class ski destination and the region's splendor as a place to vacation, gamble, live, work, build, and invest. In following years, subdivision and construction at Tahoe accelerated: Some people were sketching plans for a San Francisco-size city with four-lane highways ringing the lake and a bridge across its iconic Emerald Bay.

A precarious partnership born

The rapidly-developing, 500-square-mile watershed was split among California, Nevada, four counties, the city of South Lake Tahoe, and Carson City. One entity could not protect Tahoe's environment on its own.

A concerned public increasingly feared Tahoe would be lost to development. Nevada State Senator and former TRPA Board Member Coe Swobe engaged in shuttle diplomacy for years between the two states in the late '60s to hammer out compromise legislation. Then, leaders in California and Nevada took an unprecedented step: With approval from Congress in 1969, they created TRPA as a regional government to manage growth in the watershed and improve its environment.

TRPA was America's first bistate compact agency created to address environmental problems at a landscape scale. Its early days were hard. Environmentalists, property owners, developers, and state and local governments had differing opinions about the agency and how it should operate. It almost didn't: The bi-state compact directed Tahoe's local governments to help fund TRPA, but the following year they refused.

"TRPA hired an executive director, but it could not pay him or hire staff," said Clem Shute, a member of the TRPA Governing Board who worked in the California Attorney General's Office in 1970 when it filed a lawsuit to compel the local governments to help fund TRPA. California Supreme Court justices heard the case and ordered them to comply. A similar case was filed and won in Nevada.

"If that hadn't happened, there would be no TRPA," Shute said.

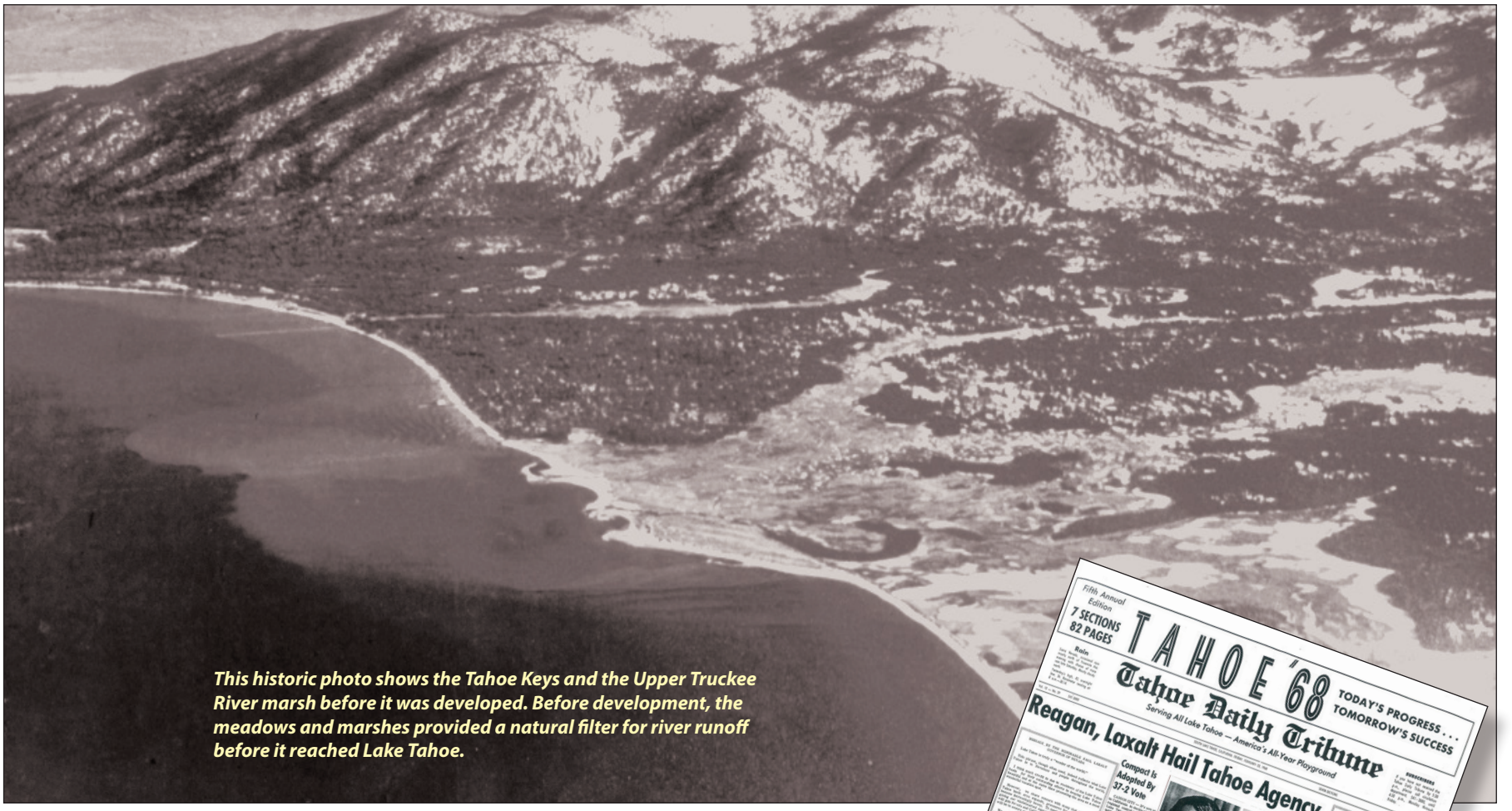
A strengthened partnership

The agency's first regional plan, adopted in 1984, was promptly sued by California and the League to Save Lake Tahoe, who successfully argued it would not adequately protect the lake. The court order plunged Tahoe communities into a controversial moratorium on new building permits until a stronger plan was in place.

Deep rifts and mistrust between the two states and other factions seemed insurmountable. Bill Morgan, who became TRPA director in 1985, convened stakeholders to try to work through big differences over how much development the regional plan should allow.

That consensus-building process was difficult, but successful, with a plan approved and the moratorium lifted in 1987. It also marked a win for the slow rise of an increasingly collaborative era at Tahoe — an era that came about as much from TRPA's shift away from a top-down, us-versus-them approach as from others in the basin being more willing to work with the agency and with each other.

"We had this major mind-shift," Marchetta said about TRPA. "We realized we couldn't do it alone, promoting



This historic photo shows the Tahoe Keys and the Upper Truckee River marsh before it was developed. Before development, the meadows and marshes provided a natural filter for river runoff before it reached Lake Tahoe.

divisions, so we had to start promoting partnership to get buy-in and get the work done."

Team Tahoe is born

Collaboration continued to grow. By the late 1990s, TRPA and local, state, federal, nonprofit, and private sector partners launched the Environmental Improvement Program (EIP), with help from former U.S. Sen. Harry Reid and the Clinton administration.

The realization was simple: Regulations and development limits would never be enough to address Tahoe's environmental problems. Managed by TRPA with 80-plus partners, the EIP prioritizes and funds projects that conserve and restore Tahoe's environment, recognizing its health is also the main driver of Tahoe's increasing recreation-based $5 billion economy.

Over two decades, the EIP has grown into one of the nation's most collaborative and successful landscape restoration initiatives, completing nearly 700 projects to date to improve air and water quality, wildlife habitat, forest health, transportation, and recreation.

Differences over TRPA's latest regional plan update would again threaten to split apart the California and Nevada partnership. But the final plan, approved in 2012 and reached through difficult collaboration, ultimately strengthened that partnership. It also saw unprecedented support from local governments and business, community, and environmental groups at Tahoe, creating a broadly shared vision for needed environmental restoration and redevelopment in the basin.

U.S. Sen. Dianne Feinstein (D-California) calls this growing partnership "Team Tahoe," touting the region's bistate, bipartisan progress.

Through these partnerships, Tahoe's meadows, marshes, streams, and forests are being restored.

Polluted stormwater is being kept out of the lake. Aquatic invasive species are being prevented and fought. Paths and trails are being built. Roads are being improved. And private investment is helping bring Tahoe's older development up to modern environmental standards to reduce its impact, restore natural areas, and create revitalized town centers that are bike- and pedestrian-friendly.

TRPA's creation and this growing spirit of collaboration have helped ensure the Tahoe Basin remains a world-class natural resource to protect, Shute, Marchetta, and others said.

"Lake Tahoe is a world-class marvel, and, for 50 years, TRPA has been instrumental in managing this unique resource," Nevada Gov. Steve Sisolak said.

"The collaborative work of Team Tahoe will be essential in the future as we address new challenges from climate change and ongoing struggles with transportation and congestion. This work will take the continued cooperation of state agencies from Nevada and California along with academic partners and private citizens, but I am confident that together we can ensure the crown jewel of the West remains protected for future generations," Sisolak said.

Tahoe's challenge

Climate change threatens to affect every natural system at Tahoe.

These systems range from temperature-driven, lake-mixing processes deep underwater that affect lake clarity to shoreline algae growth. Climate change will also affect forest health, wildfire frequency and intensity, wildlife habitat, and the reliability of winter snow.

Last century's runaway development was halted at Tahoe. Today, the basin is 90 percent public land with about 55,000 residents.

But the growth of surrounding cities—from Northern Nevada to the San Francisco Bay Area—has put tens of thousands of new residents within driving distance of Tahoe. This has put additional visitation and recreation pressures on the region.

What's more, many people who live or work at Tahoe struggle to find affordable housing and living-wage jobs.

Over the next half century, all the partnerships that helped save Tahoe before must be strengthened and grown, expanded with new people and ideas, and applied at larger scales, said Joanne Marchetta.

"I believe there needs to be yet another mind-shift, and it needs to be around the willingness to move beyond divisions," Marchetta said. "We need to evolve beyond the old 'us versus them' at Tahoe and see ourselves all as one part of whatever it is we're working on. It's not 'You're wrong' or 'I'm right.' It's finding common truth in everyone's point of view and then making that part of the solution."

Tom Lotshaw is the former public information officer for TRPA.

50 YEARS TAHOE REGIONAL PLANNING AGENCY

The Landscape Restoration Strategy lays the groundwork for restoring the entire West Shore, and can also inform other restoration work in the Sierra Nevada.

Lake Tahoe West goals:

- Plan restoration actions based on landscape-specific scientific analysis and modeling.
- Coordinate restoration at the landscape scale, across land ownerships.
- Restore the resilience of forests, watersheds, and communities in the face of climate change.
- Explore new methods for treatments in areas that are challenging to manage, such as steep slopes and streams.
- Proactively manage habitat to protect sensitive and threatened species, such as the California spotted owl and Northern goshawk.
- Increase the use of fire as a restoration tool.

Landscape restoration goals:

- Forests recover from fire, drought, and insect and disease outbreaks.
- Fires burn at primarily low to moderate severities and provide ecological benefits.
- Terrestrial and aquatic ecosystems support native species.
- Healthy creeks and floodplains provide clean water, complex habitat, and buffering from floods and droughts.
- People live safely with fire and enjoy and steward the landscape.
- Restoration is efficient, collaborative, and supports a strong economy.

Photo: California Tahoe Conservancy
The West Shore of Lake Tahoe.

Restoring Tahoe's West Shore

By Sarah Di Vittorio
National Forest Foundation

The Lake Tahoe West Restoration Partnership has released a strategy to restore forest and watershed health across 60,000 acres of federal, state, local, and private lands on the West Shore of the Lake Tahoe Basin. The new Landscape Restoration Strategy will also help protect West Shore communities from the threat of catastrophic wildfires.

"Decades of fire suppression have left forests with an accumulation of fuels that must be made a priority," said North Tahoe Fire Chief Mike Schwartz. "Only a strategy of this caliber can address restoring forests, streams, and wildlife habitat at the pace and scale necessary to be effective. Landscape level restoration protects communities from wildfire and creates resilient forests."

The Lake Tahoe West Restoration Partnership—a collaborative effort led by the USDA Forest Service Lake Tahoe Basin Management Unit, California Tahoe Conservancy, California State Parks, Tahoe Regional Planning Agency, Tahoe Fire and Fuels Team, and National Forest Foundation—developed the strategy to complement ongoing efforts to reduce fire hazards near West Shore communities and to provide a science-based framework to guide continued forest and watershed restoration over the next two decades.

Wildfire, drought, and insects and disease epidemics — pressures that are amplified by climate change — threaten forests, watersheds, and communities across the Lake Tahoe West landscape. The strategy aims to increase resilience to these pressures.

Based on this strategy, land management agencies will substantially increase the pace and scale of restoration actions, including forest thinning, prescribed fire, and meadow, aspen, and stream restoration. Coordinated across land ownerships, these restoration approaches will restore and build more resilient ecosystems, wildlife habitat, communities, and recreation and economic opportunities.

The strategy also calls for continued investment in increasing the resistance of homes to ignition by embers, establishment of defensible space around homes and neighborhoods, and community wildfire protection planning that protect communities from high-severity fire.

The strategy covers more than one-third of the Lake Tahoe Basin, a landscape stretching from the Lake Tahoe shoreline to the ridgetop, from Emerald Bay north to Tahoe City.

Agencies are planning and implementing numerous fuels-reduction projects near communities and have begun planning additional restoration projects, across more of the landscape, based on this strategy.

"This strategy defines a vision and a path forward," said Jeff Marsolais, forest supervisor for the Lake Tahoe Basin Management Unit. "By inviting key partners and stakeholders to the table, we've been able to consider a strategy beyond just the National Forest system on the West Shore."

Partners in the Lake Tahoe West Restoration Partnership include the USDA Forest Service, Lake Tahoe Basin Management Unit; the Forest Service Pacific Southwest Research Station; the California Tahoe Conservancy; California State Parks; the Tahoe Regional Planning Agency; the Lahontan Regional Water Quality Control Board; the National Forest Foundation; and the Tahoe Fire and Fuels Team; along with two dozen stakeholders and the Washoe Tribe of Nevada and California. The partnership also includes scientists and stakeholders representing conservation, fire protection, recreation, homeowners and businesses, and local government. Learn more and download the strategy at laketahoewest.org.

Sarah Di Vittorio is the Northern California program manager for the National Forest Foundation.

Tiny shrimp causing big problems for Tahoe's water quality

By Heather Segale
UC Davis Tahoe Environmental Research Center

Photo: UC Davis
The UC Davis Tahoe Environmental Research Center's ship trawls to collect Mysis shrimp. The trawler usually works at night when the shrimp are near the surface of the lake.

Lake clarity is impacted by many factors, including human development, algal growth, fine particles, lake physics, and climate change. Although Lake Tahoe continues to face multiple threats, a promising new project to remove tiny invasive shrimp could be a big step toward restoring its famed lake clarity.

In the 1960s, non-native shrimp, *Mysis diluviana,* were introduced to Lake Tahoe and Emerald Bay as a food source for the lake's trout population.

Monitoring by UC Davis researcher Bob Richards found that this introduction was an ecological tragedy. The Mysis would migrate to the depths of the lake to avoid light during the day and then rise to the surface at night to feed on native zooplankton, which helped keep the lake blue and clear while also serving as a food source for native fish. The result was that the two dominant zooplankton, *Daphnia* and *Bosmina*, largely disappeared from the Tahoe system and the average trout size diminished.

Removing Mysis shrimp

UC Davis Tahoe Environmental Research Center (TERC) researchers found that when Mysis shrimp mysteriously disappeared from Emerald Bay in 2011, native zooplankton populations rebounded almost immediately. Within two years, clarity in Emerald Bay had increased by almost 40 feet. The reverse occurred when the Mysis returned.

TERC is currently completing a two-year pilot project to determine if trawling is an effective means of removing enough Mysis shrimp to improve lake clarity.

"Even with climate change, we're finding that if you get rid of the shrimp, clarity improves," said Geoffrey Schladow, director of UC Davis TERC and a professor in the College of Engineering. "Their removal allows for the return of native zooplankton, which have the ability to consume both tiny algae and fine clay particles that have reduced clarity in the past."

Climate change and the loss of native predators are triggering an explosion in the population of tiny algae. The native zooplankton have long been known to consume them, whereas the Mysis shrimp don't particularly care for them. So removal of Mysis may act as a counterbalance to the changing climate.

Many solutions working together

Summer clarity continues to decline at Lake Tahoe, largely offsetting the gains made in winter clarity. With climate change predicted to accelerate warming and earlier runoff from streams, the decline in summer clarity is expected to continue, threatening the progress that has been made in the last 20 years.

"The efforts long underway in the Tahoe Basin to improve lake health and clarity have been and continue to be important," Schladow said. "Maintaining and building resiliency requires many solutions working together, as well as deploying more tools than we've currently been using. That's one reason we find this ecological solution to be so exciting. Our clarity goals don't have to be derailed by climate change."

This novel ecological approach, focused on the removal of the Mysis shrimp, may be able to restore the lake's native zooplankton and increase the clarity to levels not seen in decades.

Once results are peer-reviewed and confirmed, the next step would be to develop a full-scale approach for a Mysis reduction program. Increased clarity and the return of the native zooplankton carries with it the additional benefits of rapid growth of native fish and a natural impediment to the growth of invasive fish and plants.

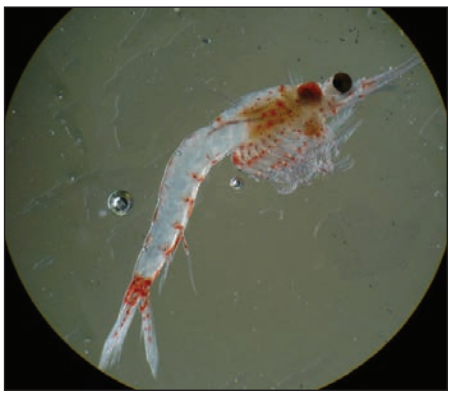


Photo: UC Davis
A closeup of a Mysis shrimp.

This UC Davis Tahoe Environmental Research Center-led pilot project is supported by the University of Nevada, Reno and funded by the California Tahoe Conservancy and the Nevada Division of Environmental Protection. The research report is currently in progress.

Heather Segale is the education and outreach director for the UC Davis Tahoe Environmental Research Center.

State of the Lake

The annual *Tahoe: State of the Lake Report* presents data in the context of the long-term record. While the report covers data collected as part of TERC's ongoing, decades-long monitoring programs, it also includes sections summarizing current research driven by the important questions of the day. A more complete description of the potential for Mysis removal as an important part of lake restoration is included in the UC Davis annual State of the Lake Report that can be downloaded at https://tahoe.ucdavis.edu/stateofthelake.

Tahoe Fund hopes to boost forest restoration

'Smartest Forest Fund' puts out a call for innovative solutions

By Jessica Weaver
SPECIAL TO TAHOE IN DEPTH

As catastrophic wildfires increase both in frequency and intensity throughout California and Nevada, the trend and the magnitude of these disasters doesn't seem to show signs of slowing. For the past several years, what has been deemed the "biggest wildfire in history" one year is tragically surpassed by another monster fire the next.

The 2018 Camp Fire in Paradise, California demonstrated what could happen in the Tahoe Basin. The Sierra Nevada has more than 147 million dead and dying trees, and the Tahoe Basin has expanded to more than 160,000 trees in just the past few years. Many experts say it's not a matter of *if* but *when* a catastrophic wildfire could move through the region.

In response, the nonprofit Tahoe Fund launched the Smartest Forest Fund in summer 2019 in partnership with the USDA Forest Service, California Tahoe Conservancy, Nevada Division of Forestry, Tahoe Fire and Fuels Team, and the Tahoe Central Sierra Initiative.

The goal is to raise $5 million to support new ideas and pilot projects that can significantly increase the pace and scale of forest restoration. These projects will support the work already underway by the Forest Service, California Tahoe Conservancy, and Nevada Division of Forestry.

"Although significant barriers to forest restoration planning and implementation exist today, the intent of the Smartest Forest Fund is to remove or reduce those barriers through technology and innovation. Supporting these efforts is the Tahoe Fund's highest priority," said John Jones, a Tahoe Fund board member who is leading the initiative.

The Smartest Forest Fund hopes to remove barriers and support projects that will decrease the time it takes to plan and approve restoration work, use technology to enhance wildlife studies and harvesting plans, find new outlets for excess fuel in the forest, prepare the community for wildfire evacuation, and find new financial tools to do more, and quickly.

As a start, the Tahoe Fund launched the Smartest Forest Fund with financial support for three projects. The first included a $30,000 grant to the Forest Service to develop an acoustic monitoring protocol and system to more effectively determine the value of habitat and the occurrence of the California spotted owl in project areas. The goal is that this will shorten the existing process from two years to one year.

The second project includes a $35,000 grant to join the Gordon and Betty Moore Foundation's support of Salo Sciences and Planet's efforts to build the California Forest Observatory. This data platform supports dynamic, real-time wildfire risk mapping and could significantly reduce the time needed for forest restoration planning, and also support emergency operations.

Finally, a $35,000 grant to the Nevada Division of Forestry will help begin the process of restarting the Carson City biomass facility. Once restarted, the biomass facility will become a destination for excess fuel harvested from the Tahoe Basin.

"We know that some of the ideas and projects the Smartest Forest Fund supports will work, and some may not. Working together with our public agency partners, we believe there is an opportunity to harness the power of philanthropy and the private sector to help fix our forest," Jones said.

The next steps for the Smartest Forest Fund is to issue a call for innovative project ideas from public agencies and private-sector organizations. Meanwhile, the Tahoe Fund is seeking contributions to help meet its $5 million goal. Once ideas come forward, the nonprofit will collaborate with public agencies to test the concepts, technologies, and other proposed solutions.

Learn more about the Smartest Forest Fund at tahoefund.org.

Jessica Weaver is a freelance writer and works with the nonprofit Tahoe Fund.

South Shore embraces several initiatives aimed at curbing greenhouse gases

By Nick Exline
SPECIAL TO TAHOE IN DEPTH

In 2016, the City of South Lake Tahoe became the 26th City in the United States to commit to 100 percent renewable energy by 2032 and 80 percent GHG reductions by 2040.

Some believe that we live in a time of conflict, disagreement, and separation.

But South Shore leaders are working together to address the defining issue of our time — climate change. The South Shore is battling climate change through planning, action, and community partnerships.

These partnerships are developing a cohesive, goal-oriented approach toward lowering our greenhouse gases. Grassroots advocacy, civic organizations, businesses, utilities, and government entities are working toward 100 percent renewable energy goals.

In 2016, the City of South Lake Tahoe became the 26th city in the United States to commit to 100 percent renewable energy by 2032 and 80 percent greenhouse gas (GHG) reductions by 2040. The Lake Tahoe Unified School District has also made the 100 percent renewable commitment and is acquiring electric buses.

The South Tahoe Public Utility District, meanwhile, is becoming more energy efficient and is engaging in solar opportunities with the city and other partners.

Lake Tahoe Community College is implementing greenhouse gas reduction measures, and the Tahoe Transportation District is introducing electric buses. South Lake Tahoe is partnering with Truckee and Nevada City on their own 100 percent renewable-energy commitments.

The business community also supports the city's 100 percent renewable resolution. Vail Resorts, for example, committed to 100 percent renewable energy and zero waste to landfills by 2030.

Liberty Utilities provides electricity to the California side of the South Shore, and its renewable-energy portfolio includes two solar projects. In 2017 Liberty opened a 50-megawatt solar facility in Luning, Nevada, that provides 25 percent of Liberty's consumers with renewable energy. This year it opened a 10-megawatt solar plant in Turqoise, Nevada.

"Liberty Utilities is committed to becoming 100 percent renewable with a mix of low-cost renewable and battery resources," said Liberty Program Manager John Friedriech.

The partnership between Liberty and the South Shore will be instrumental in achieving renewable-energy goals. However, obtaining 100 percent of energy from renewable sources will not be enough to meet the city's goal for an 80 percent reduction in greenhouse gases by 2040.

Going 100 percent renewable at the local, national, or international levels will not be enough to reduce emissions to the point at which the planet can avoid the worst effects of climate change.

In the face of these challenges, the South Shore has demonstrated that it is ready to lead on the issue of climate change. Through building on its existing partnerships, the South Shore can develop a regional framework to surpass carbon neutrality and become a carbon reservoir.

Nick Exline is a senior planner with Midkiff & Associates, founder of the Tahoe Climate Change Action Network, chairman of the City of South Lake Tahoe's 100% Renewable Committeee, and South Tahoe Public Utility District board director.

Agencies accelerating forest thinning

Plan would reduce wildfire risk, improve forest health at Tahoe

By Tom Lotshaw
Tahoe In Depth

The Tahoe Fire and Fuels Team has developed a new forest action plan to accelerate projects to thin Lake Tahoe's dangerously overstocked forests.

Devastating wildfires have burned in California and Nevada in recent years. With an estimated 147 million dead and dying trees in the Sierra Nevada from drought and bark beetle outbreaks, a warming climate threatens to make catastrophic fires more common.

The new Lake Tahoe Basin Forest Action Plan has two main goals:

- Healthier forests in the basin that are more resilient to drought, insect attacks, and catastrophic wildfire.
- Communities that are better prepared for Tahoe's next wildfire.

"The Lake Tahoe Basin is extremely vulnerable to wildfire," North Tahoe Fire Protection District Chief Michael Schwartz said.

"To protect our residents and visitors and the health of our forests, this (action) plan is focused at every level: From our homes and businesses to our shoreline communities, evacuation routes, powerline corridors, and scenic ridgetops," Schwartz said.

More than 20 local, state, and federal partners make up the Tahoe Fire and Fuels Team, which formed after the 2007 Angora Fire to coordinate and implement projects to reduce wildfire risk and improve forest health in the Tahoe Basin.

Partners include the USDA Forest Service; state parks, forestry, and firefighting agencies for California and Nevada; local fire protection districts; the cooperative extensions for University of California and University of Nevada; California Tahoe Conservancy; Tahoe Regional Planning Agency; and Tahoe Resource Conservation District.

Tahoe Fire and Fuels Team partners have thinned more than 57,000 acres of forest at Tahoe in the years since the Angora Fire, and more than 77,000 acres of forest overall.

Over the next five years, the action plan targets another 22,000 acres of forest thinning in the "wildland-urban interface," completing an initial round of fuel-reduction treatments in the most dangerous and vulnerable areas where Tahoe's forests and communities meet.

Photo: Drone Promotions

A crew harvests timber as part of a forest thinning and ecosystem restoration project to make Tahoe forests more resistant to catastrophic fire.

Another goal of the plan is to help 100 percent of property owners in the Tahoe Basin create and maintain adequate defensible space around their homes and businesses.

Creating and maintaining defensible space is vital, officials said, as it manages the amount of flammable brush in developed areas, making it harder for wildfires to spread to structures and up into the tree canopy, and safer for firefighters to battle blazes.

Other aspects of the Lake Tahoe Basin Forest Action Plan include:

- Implementation of larger, landscape-scale forest restoration projects spanning local, state, and federal boundaries, such as the Lake Tahoe West Restoration Partnership that targets 60,000 acres of West Shore forest;
- Development of an expanded and shared workforce for more forest thinning and restoration at Tahoe;
- More coordinated and strategic use of prescribed fire to reduce wildfire risk and improve forest health;
- And greater support of markets for biomass materials and small diameter trees.

"Our forests in the Tahoe Basin are under increasing stress from our changing environment," said Jeff Marsolais, forest supervisor for the USDA Forest Service Lake Tahoe Basin Management Unit.

"In response, agencies have undertaken and are implementing landscape-scale initiatives to restore forest health and increase resilience around the basin. This forest action plan has galvanized our continued commitment to increasing the pace and scale of restoration across all (land) ownerships."

For more information

Learn more about the Lake Tahoe Basin Forest Action Plan and the steps that you can take to better prepare your home and community for Tahoe's next wildfire at tahoe.livingwithfire.info.

2019 Fires

Hundreds of thousands of people throughout broad parts of California grappled this fall with planned power shutoffs, a step increasingly taken by utilities trying to shut down power lines to help prevent wildfires during dry, windy conditions.

But major fires still ignited.

The Kincade Fire in Sonoma County ignited Oct. 23. The fire forced 180,000 people out of their homes and burned more than 77,000 acres and 174 residential structures in a dozen days.

In Southern California, the Maria Fire on Halloween burned more than 9,400 acres in Ventura County, forcing thousands to temporarily evacuate.

Falcons successfully nesting at Castle Rock

Continued from page 4

over the summit area close to the nest site. The falcons usually respond by flushing from the nest site and circling over hikers making alarm calls.

Sean Tevlin, an associate environmental specialist with TRPA, recruited volunteers who climbed and hiked near the nest at the same time while the falcons were observed. The falcons almost completely ignored the climbers, while the hikers who made it to the top of Castle Rock were met with aggressive behavior.

In 2019, in response to these observations, the interagency group posted signs on the trails leading to Castle Rock, warning hikers about the birds and noting that the signs would be removed when the nesting period was over. News spread through social media as the public learned more about these rare birds. Biologists noted that despite plenty of hiker and climber use at Castle Rock, most hikers obeyed the signs and did not summit. The two parent falcons successfully raised two young birds.

This success benefitted from the work of many agencies and partners, including the Forest Service, NDOW, TRPA, TINS, Sierra Ecotone Solutions, Tahoe Rim Trail Association, and the Tahoe Climbing Coalition.

With recent parking lot improvements to the Castle Rock trailhead, more hikers are expected in the future. Monitoring will continue to ensure these birds can raise their young.

"You don't have to go back that far to when there were no peregrine falcons nesting in the Tahoe Basin," Enders said. "To see more than one successful nest per year, on the East Shore alone, is exciting."

In regard to peregrine falcons, Tahoe seems to be heading in the right direction.

Jennifer Pennington is an environmental attorney and T. Will Richardson is the co-founder and executive director of the Tahoe Institute for Natural Science.

Photo: T. Will Richardson, Tahoe Institute for Natural Science

A peregrine falcon in flight near Donner Summit.

DRI invites citizen scientists to help with snow research

Continued from page 5

to a generous grant from the Tahoe Fund, the Stories in the Snow team will be distributing 1,500 free Stories in the Snow kits (which consist of a magnifying lens, thermometer, and snow crystal capture card) and conducting short training sessions at area ski resorts this winter. Representatives from the project will be at the Mount Rose Ski Area on Jan. 4-5, Diamond Peak on Jan. 11-12, and other locations yet to be determined.

To donate to the program, visit the Stories in the Snow website (dri.edu/stories-in-the-snow). For $25, the donor will receive a kit and also provides a kit to a local student. Any donations made to the Stories in the Snow program via the Tahoe Fund between now and Dec. 31 will be doubled by the Mathman Family.

"Although the project has been popular with students, anyone of any age is encouraged to participate and spend some time up close with Tahoe's beautiful snow," Collins said.

"This project provides an opportunity for people to enjoy the beauty of snow crystals, to connect with place, to celebrate Tahoe as a region, and to celebrate the role that snow plays in our culture here – all while helping us understand the snow that provides the water that we all rely on," Collins said.

Kelsey Fitzgerald is a science writer for the Desert Research Institute's Communications Office.

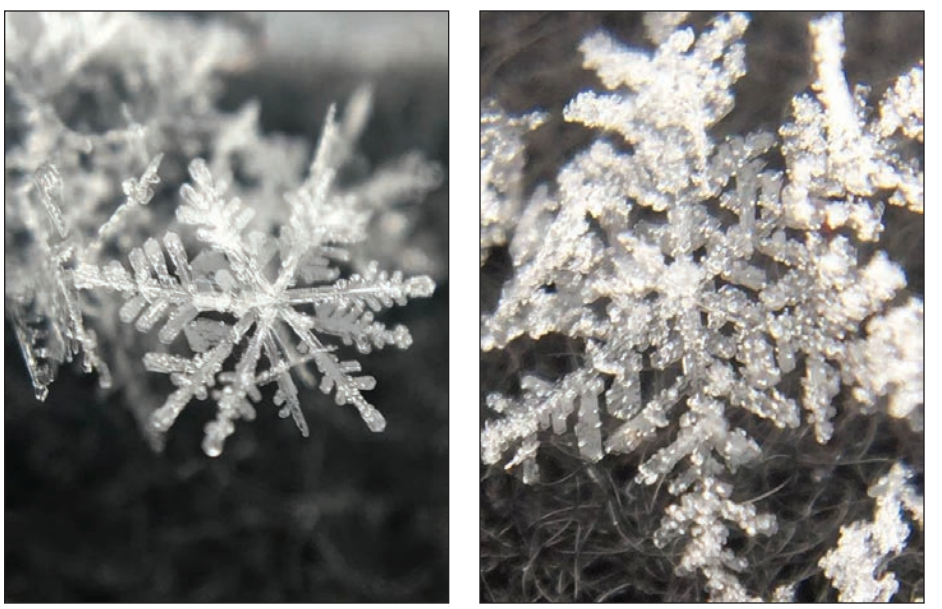


Photo: Desert Research Institute

Snow crystal images sent in to Stories in the Snow by citizen scientists.

SOS Outreach creates opportunities for youth

Program introduces snow sports to underserved students, mixing in lessons about life

By Chris Larson
Tahoe Regional Planning Agency

When the winter snows arrive, many Tahoe locals and visitors' thoughts turn to fresh powder.

That's not the case for everyone. For hundreds of young people at Lake Tahoe, that ticket to ride is out of reach.

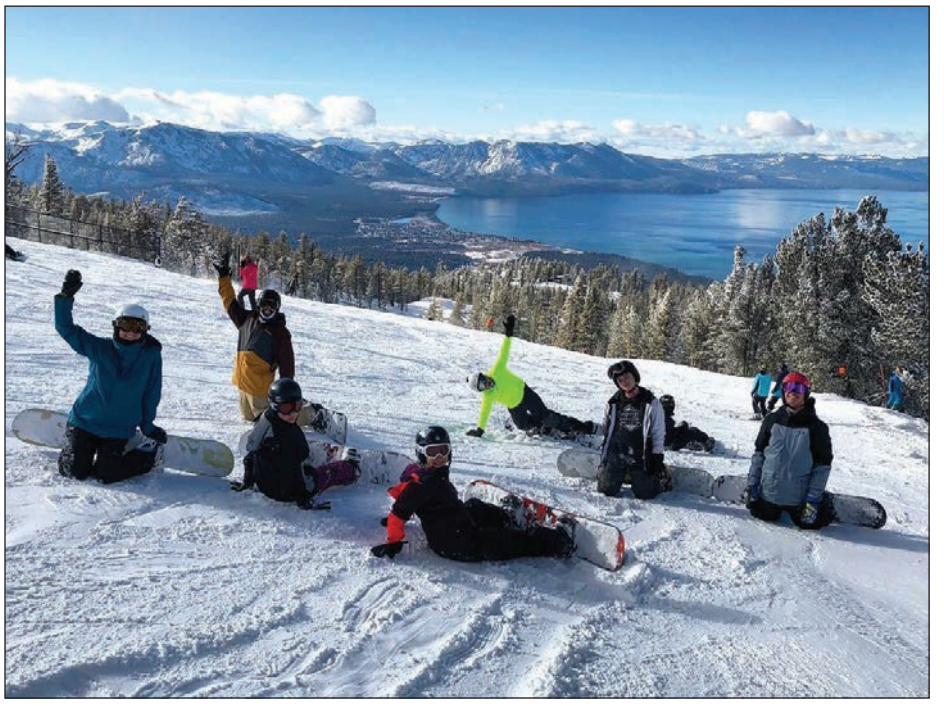
But now the SOS Outreach program is linking skiers and snowboarders with that underserved community of young people. The program exposes youth to skiing and snowboarding while instilling core values to help guide them through their formative years.

The focus of the program is young people from single-parent households or homes where parents work multiple jobs to make ends meet. Some have been bullied in school or may have even suffered physical abuse. SOS Outreach introduces them to a new reality by getting them up on the mountain and onto the snow.

The SOS program started in Colorado's Vail Valley 26 years ago. The one-day program brought underserved youth from the Denver metro area to the mountains for a day of skiing and riding. It grew from a one-day outing into five days and began incorporating life skills and leadership lessons. It now includes community service projects as well. Organizers say the program helps children reflect on how they can be of service to their communities, even at a young age.

SOS Outreach is now working with underserved youth in mountain resort communities across the country. Some 60,000 young people have matriculated through the program, and more than 13,000 people have volunteered their time and talents, many as volunteer mentors.

"I love being out there with the kids. I love watching them have a good time and progress during the season," said Robbie Graves, who works for the Tahoe Regional Planning Agency and has been an SOS volunteer for the past six winters. He's one of a handful of people at the agency who volunteer their time working as mentors. "What better way to share my passion for skiing and snowboarding than with kids who may not otherwise be able to afford the sport?"



Photos: SOS Outreach

The SOS Outreach program is linking skiers and snowboarders with Tahoe's underserved community of young people. The program exposes youth to skiing and snowboarding while instilling core values to help guide them through their formative years.

Costs to the kids are largely defrayed by corporate donations. Sponsors like Vail's Epic Promise program, and gear manufacturers EVO, Smartwool, Spyder, and The North Face, fund the program. Many local businesses also donate meals. For mentees, SOS costs $150 and includes a season pass, but scholarships are available for those who can't afford the tuition.

SOS also offers a five-day learn-to-ride program starting in the third grade. This program is mandatory before a student can begin participating in the full mentoring program.

Leaders emphasize that SOS is not about becoming a great skier or snowboarder but about becoming a better person.

SOS Outreach is beginning its 14th season in Lake Tahoe, with mentoring programs operating at both Heavenly Mountain Resort and Northstar. The program serves about 600 children a season, with more than 100 volunteer mentors from across the community giving their time and talent. Mentors go through a rigorous training program so they can help achieve a positive experience for their mentees. The training focuses on the program's six core values: courage, discipline, integrity, wisdom, humility, and compassion.

Graves says it's satisfying to see the year-to-year growth and understanding his mentees experience as they interact with their peers and embrace the six core values.

"The first couple of seasons you're teaching them what those words mean," said Graves, "the third and fourth year they remember, and if they see something on the mountain, they'll point it out."

A mentor is paired with three to five kids over the season. There are various life-skill development events, but the highlight is the five on-mountain ride days, which start in January. Each ride day centers on one of the program's core values. Kids typically enter the program in elementary school and progress over a four-year period, after which they are eligible to become junior mentors.

Theresa Papandrea has worked full-time with the SOS program for the past 14 years. She and her husband Frank, who works for Heavenly, moved to Tahoe eight years ago.

"I truly see the transformation in the youth we serve," said Papandrea, "To watch them practice life skills, to have a positive mentor and the connection they have with the community, it builds better humans. They have hope for the future and how they can contribute."

This will be Alyssa Bettinger's first year volunteering as a mentor with SOS. She works as a planner for TRPA but has fond memories of being a ski instructor in high school and volunteering as a coach with Special Olympics.

"A lot of these kids wouldn't have the opportunity to go skiing or snowboarding without this program and just having a different perspective can open their eyes to a way of life that they didn't know existed," Bettinger said.

If you would like to learn more about the SOS Outreach program, or how you can donate or become a volunteer, please visit www.sosoutreach.org.

Chris Larson is the public information officer at TRPA.

At Tahoe Summit, leaders tout progress

With basin's restoration on track, focus must stay on climate change

By Tom Lotshaw
TAHOE IN DEPTH

Photo: Chris Larson, Tahoe Regional Planning Agency
California Gov. Gavin Newsom delivers the keynote address at the annual Tahoe Summit.

Gathering at Valhalla Resort in August for the 23rd annual Tahoe Summit, congressional leaders and the governors of California and Nevada touted two decades of growing progress in their partnership to conserve and restore Lake Tahoe's environment.

But the focus must stay on climate change, they said, as warming air and water temperatures stress forests and imperil the long-term health of Tahoe and other landscapes around the world.

Hosting the summit, U.S. Sen. Dianne Feinstein (D-Calif.) said "Team Tahoe" is making major restoration strides through the Lake Tahoe Environmental Improvement Program (EIP).

"What we are doing as a bistate, bipartisan, public-private partnership is really working, and I want to say thank you to everybody," Feinstein said.

The EIP was launched at the first Tahoe Summit in 1997. The program joined more than 50 local, state, federal, tribal, and private-sector partners in a shared mission to complete projects needed to restore Tahoe's environment and improve public recreation opportunities.

Over the past two decades, partners have invested more than $2 billion and completed hundreds of projects, and the program has grown into one of the world's most collaborative and successful, landscape-scale environmental restoration initiatives.

EIP projects have built or improved 157 miles of bike and pedestrian trails at Tahoe; upgraded 791 miles of roadway to reduce harmful erosion and stormwater pollution; inspected 80,284 boats to prevent the introduction of new aquatic invasive species; opened 3,195 feet of shoreline for public access; treated 70 acres of lake to remove invasive aquatic weeds and clams; restored 1,743 acres of wetland; and thinned 77,505 acres of overgrown forest to reduce wildfire risk and improve forest health and resiliency.

These coordinated projects are improving air and water quality, forest health, wildlife habitat, and recreation opportunities throughout the Tahoe Basin, helping to restore the lake's famous water clarity and address the lingering impacts from the past of haphazard development, grazing, and forest clear-cutting.

"The problem we are dealing with now is climate change," Feinstein said.

Warming temperatures threaten Tahoe's alpine environment, communities, and recreation-based economy. They make the lake more habitable to invasive species and algae growth, change precipitation patterns, affect the lake's water clarity, and put expansive forests at greater risk of drought, insect attacks, tree mortality, and catastrophic wildfire.

Other leaders at the summit agreed climate change must remain a top priority for "Team Tahoe," including U.S. Sen. Catherine Cortez Masto (D-Nevada), U.S. Rep. John Garamendi (D-Calif.), and two newly-elected officials: Nevada Gov. Steve Sisolak and California Gov. Gavin Newsom.

"We cannot put off solutions to carbon and other greenhouse gas emissions and we can't ignore the effects of climate change that are visible around us every single day," Cortez Masto said.

Garamendi said addressing climate change is society's most fundamental challenge. "If your elected officials are not willing at the county, the city, the state, and the federal level to address this issue, they ought not be in office because this is our challenge."

Catastrophic wildfire was another major topic at the Tahoe Summit. Severe wildfires in California and Nevada in recent years drive home the need for healthy forests and well-prepared communities.

Referring to the 2018 Camp Fire that destroyed the foothill town of Paradise, California, Rep. Tom McClintock (R-Calif.) said, "A similar fire here would mean the utter destruction of all of Tahoe's communities, and be aware, our forests are no different than those that surrounded Paradise that day. A recent survey reported that the Tahoe Basin carries four times its safe fuel density."

The multijurisdiction Tahoe Fire and Fuels Team has made forest health a top priority in the years following the 2007 Angora Fire. The partnership has thinned brush and trees on nearly 60,000 acres of overgrown forest to reduce fire risk, while launching new programs that help property owners create defensible space and prepare communities for Lake Tahoe's next wildfire.

Nevada Gov. Steve Sisolak noted the state's commitment to the partnership of the Tahoe Fire and Fuels Team and the accomplishment of treating all state-owned urban lots in Nevada for defensible space. And climate change, officials stressed, can be addressed with coordinated action. Governor Newsom touted California's leadership in reducing greenhouse gas emissions, adding that Lake Tahoe "is a proxy for all our efforts."

"We're in the implementation business in California … We're actually leading at a scale no other state in our union is leading. Our low-carbon, green growth goals are second to none," Newsom said in his keynote speech at the Tahoe Summit. "We have commitments to get five million new electric vehicles out on the streets in the next 10 or so years. We have commitments to get to 100 percent renewable energy. Last month we announced we have already exceeded our 2020 goals in terms of renewable portfolios, proving that this can be accomplished, proving that this can be done."

Initiatives aimed at improving transportation

Updated transportation blueprint, Route 89/Emerald Bay plan, and Commute Tahoe target congestion

By Devin Middlebrook
Tahoe Regional Planning Agency

Lake Tahoe planners are working on several fronts to overcome one of the thorniest problems facing the Tahoe Basin:

Transportation.

While bike lanes, paths, free buses, and other incentives have made getting around Tahoe without a car much easier in recent years, much more needs to be done. During peak times, vehicles still clog many roads and highways around the basin. The problem worsens around popular attractions, such as Emerald Bay.

These issues will be the focus of three major initiatives aimed at getting visitors and residents alike out of their cars and using alternative means to get around the lake.

Regional Transportation Plan

The Tahoe Regional Planning Agency has kicked off the next update of its transportation plan. The new plan will outline the transportation system for Lake Tahoe through 2045.

To achieve regional transportation goals, Linking Tahoe contains projects that support transit, trails, technology, and communities. The projects identified in Linking Tahoe will create a fully connected system for residents, commuters, and visitors to the Region.

TRPA will be asking the community throughout 2020 for its input on projects and programs to address the Region's transportation challenges. Public input into the Regional Transportation Plan is important for ensuring the plan meets the needs of residents, businesses, and visitors. To learn more about the Regional Transportation Plan update, take a short survey, and sign up for e-updates, visit www.trpa.org/RTP.

Lake Tahoe's West Shore

The State Route 89 Corridor Management Plan focuses on improving safety, expanding travel choices, enhancing visitor experience, protecting the environment, and promoting economic vitality on Tahoe's West Shore.

The plan boundaries reach from West Way near Camp Richardson just outside the City of South Lake Tahoe to the Placer County line at Tahoma. Neighboring areas will also be analyzed for potential improvements that may assist in improving traffic flow and the visitor experience.

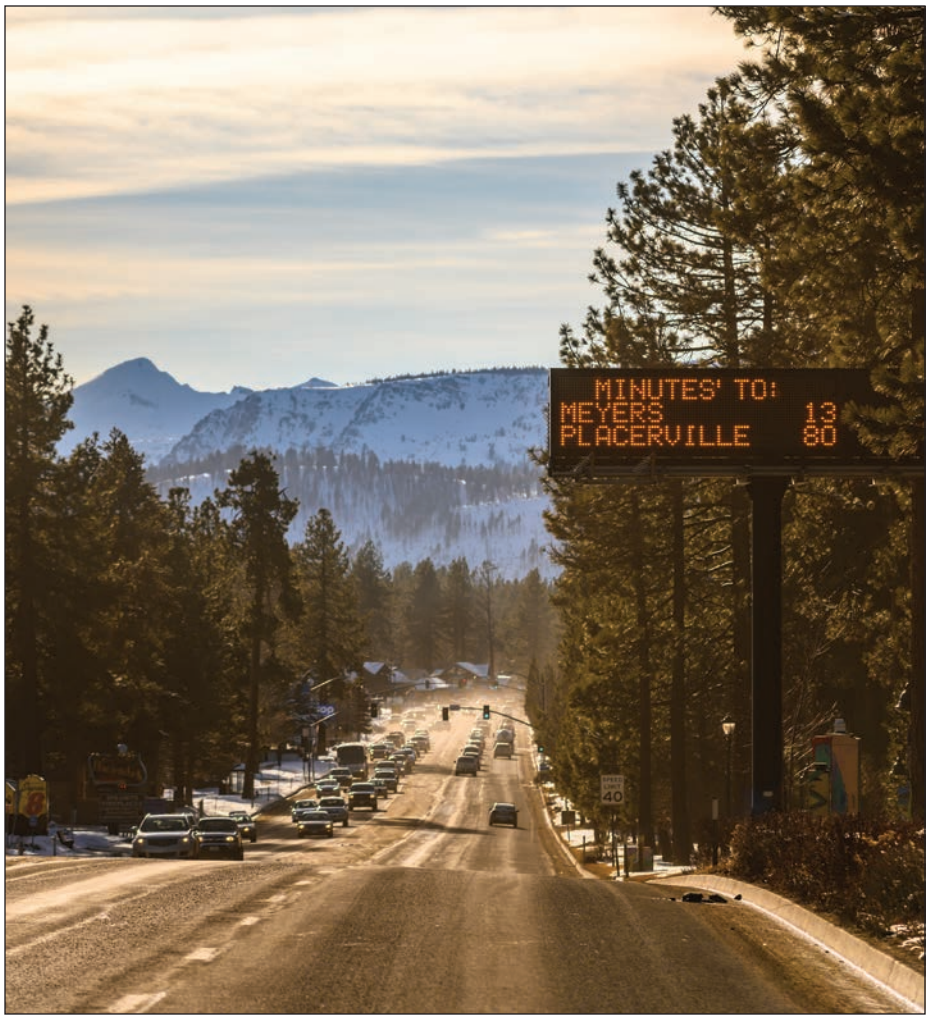


Photo: Bryan Liscinsky, Novus Select
New technology provides real-time travel updates.

This plan is being led by the Tahoe Regional Planning Agency, USDA Forest Service, and Tahoe Transportation District with involvement from over 20 agencies, nonprofits, businesses, user groups, and members of the public.

Over the last year, the project team has collected extensive data and interviewed dozens of stakeholders in the corridor. A variety of strategies and projects will be recommended as part of the plan. The strategies could bring some big changes to the West Shore of Lake Tahoe, including a parking reservation system, transit-only access during the summer, expansion of shared-use paths and the Tahoe Trail, elimination of roadside parking, and transit-only lanes.

Stay tuned for opportunities to give input and comment on the corridor plan. Public workshops, webinars, and open houses are being scheduled for early 2020. The draft State Route 89 Recreation Corridor Plan is expected to be released for public comment in 2020. To learn more about this project please visit http://bit.ly/StateRoute89Plan.

New Regional Commute Program

This winter, the Tahoe Regional Planning Agency is launching a new trip-reduction program, Commute Tahoe, for Lake Tahoe employers. The program aims to encourage employees to bike, walk, carpool, or take transit to and from work. The mission of the Commute Tahoe program is to empower Lake Tahoe workers to ditch their cars.

Local employees can help reduce roadway congestion by choosing to forgo driving several times per week. Those choices are much easier to make when employers offer support and encourage their employees. Example incentives include secure bike parking, subsidized buses, and flexible schedules.

TRPA is offering free support to help employers get started and build a successful program. Employers that promote and advance sustainable commute options at their workplace will receive a Commute Tahoe Certification and will be eligible for Best in Basin recognition.

Prior to launching Commute Tahoe regionwide, TRPA worked closely with the League to Save Lake Tahoe and Heavenly Mountain Resort to pilot the program.

"We offer incentives for employees and guests to get to our office and education center without a car," said Darcie Goodman Collins, CEO of the League to Save Lake Tahoe. "We provide secure bike parking, loaner locks and helmets for guests, bike maps and safety gear, and a changing and storage area to cool down if you have a long ride. We also offer incentives for employees who get to work by walking, biking, busing, or carpooling – from a free lunch to a day off. Next time you come visit us, leave your car behind!"

The Commute Tahoe program will offer an online portal that contains tools for employers to survey their staff directly and assess transportation needs. Commute Tahoe is an elective program, and all online resources and materials are free to employers.

Vail Resorts also participated in the pilot program and plans to use the online employer portal to survey resort employees to determine their transportation needs, according to Frank Papandrea, sustainability manager for Heavenly Mountain Resort.

Although the program is voluntary, we all have a part to play to address and solve congestion issues in our Tahoe communities. Providing support to commuters is one piece of the complex transportation puzzle. To learn more about Commute Tahoe and to register your workplace, visit www.linkingtahoe.com/commute-tahoe/ or contact Kira Smith at ksmith@trpa.org.

A Masterful Mural

Local high school teacher and students create invasive species art

By Chris Larson
Tahoe Regional Planning Agency

Photo: Chris Larson, Tahoe Regional Planning Agency
Boaters stopping to have their watercraft inspected near Meyers are greeted by a colorful mural produced by local students.

Earlier this summer, a work of art invaded the watercraft inspection station in Meyers, California.

One of several inspection stations around Lake Tahoe, the Meyers station is located just off Highway 89 near the new Highway 50 roundabout. The Tahoe Resource Conservation District performs mandatory watercraft inspections during the boating season. For the past 11 years, the Lake Tahoe Watercraft Inspection Program has helped protect Lake Tahoe from the introduction of new aquatic invasive species.

During this time, one of the first things that greeted boaters at the Meyers station was a gray, hulking shipping container. The steel container houses decontamination machinery and equipment used to inspect and clean watercraft that could be harboring invasive species. Other than a few signs attached to the crate's corrugated sides, it wasn't much to look at; it didn't have any artistic value or add intrinsic beauty to the station.

Tom Boos wanted to change that. One day while driving through the City of South Lake Tahoe, Boos, TRPA's aquatic invasive species prevention coordinator, noticed artwork adorning utility boxes across town. Boos thought, if you can artfully paint a small utility box, why not turn the side of a shipping container into a work of art?

"The decontamination unit in Meyers was more than 10 years old, and it looked shabby and weathered," said Boos. "To keep a professional and welcoming appearance, the container needed at the very least a good paint job."

It soon got more than a coat of paint.

Boos discovered that the utility boxes were painted by local high school artists under the guidance of their teacher. He reached out to South Lake Tahoe High School art teacher Matt Kauffman, and after months of collaboration, the group decided that the mural would try to encapsulate a Tahoe sunset. TRPA commissioned the mural.

"We get such epic sunsets out here on the lake," said Kauffman, "we were just trying to capture the essence of that beauty, and I think the kids did a really good job of meeting that goal."

Current and former students helped bring Kauffman's artistic vision to life. Kaya Robert, Dakota Jensen-Bertram, and Jorge Ramos painted the mural project over five different summer evenings. Each night they painted until the daylight receded to night. In those minutes between sunset and darkness, the colors of the mural came alive. Photographers and painters call this the blue hour, a brief period after sunset when the fading light is evenly diffused and colors pop.

The artists used more than 70 cans of high-quality Montana Colors spray paint, mixing 12 colors to give them the desired spectrum of a Lake Tahoe sunset. They also used a variety of spray tips and nozzles, adding to the soft transitions of color evocative of the sun setting behind high clouds hanging close to the Sierra crest.

The final task was to letter and paint the watercraft inspection program's mantra: Clean, Drain, and Dry. The message alerts anyone taking a vessel onto Lake Tahoe's waters to arrive at inspection stations with their boat clean, drained, and dry. These three easy steps ensure Lake Tahoe is protected from the introduction of new aquatic invasive species.

The mural maintains a crucial message and provides a beautiful piece of art for the boating community. Watercraft inspections are mandatory at Lake Tahoe, and now — at least at the inspection station in Meyers — they will also be colorful, whimsical, and fun to boot.

To learn more about the work being done to keep aquatic invasive species out of Lake Tahoe, please visit www.tahoeboatinspections.com.

New CapRadio podcast explores how climate change is affecting Lake Tahoe

By Ezra David Romero
Capital Public Radio

The year is 2099. There's a red glow on the north side of Lake Tahoe. Another wildfire is burning. The region hasn't seen solid snow in a decade. And that pristine blue lake is turning … green.

That's not a pretty picture. But Tahoe could transform dramatically by the end of the century because of our climate crisis.

CapRadio's new podcast "TahoeLand" looks into the science behind the dilemma — and examines what we can glean from Tahoe and how it might even hold solutions for climate change globally.

Today, Tahoe is a jewel in the sky. It's one of the most popular lakes in the West. It has more visitors than Disneyland.

The Tahoe of end of the century has less snow, lots of rain, more extreme wildfires — and tons more people. But what makes Tahoe interesting is that there's so much data collection taking place — it's a petri dish for research. And that's what the podcast explores: To see if Tahoe holds answers for how we can better adapt to this climate crisis. And it all begins and ends with the lake.

We based the science in the podcast largely off a draft climate vulnerability assessment put together by a team associated with the California Tahoe Conservancy.

"What we've already seen in our data is climate change is effectively making the summers longer and the winters shorter," says professor Geoff Schladow, director of the UC Davis Tahoe Environmental Research Center.

He says when its hotter, it's tough for the warm water at the surface of Lake Tahoe to mix with the cool water below. It also gets less windy, and wind helps mix the lake. Schladow says this turns Tahoe into a fish bowl just sitting there, getting murkier and growing algae on its walls.

The podcast focuses on the worst case scenario through local voices and scientists. It touches on what can be done now to prevent some of the effects of climate change.

The podcast also looks at how snow is changing, how climate change impacts the economy, casinos, bears, forests, roads, and so much more. Check it out wherever you listen to podcasts by searching "TahoeLand" or visit capradio.org/tahoeland for episodes, stories, videos, photos, and more.

Ezra David Romero is an environment reporter for CapRadio and the host of the new podcast "TahoeLand."

Tahoe City Lodge underway

Lake-friendly development key to a revitalized downtown district

By Samir Tuma
SPECIAL TO TAHOE IN DEPTH

Illustration: Kila Tahoe, LLC
An artist's rendering of the Tahoe City Lodge.

Nearly a decade ago, Tahoe City community members created a vision for Tahoe City's future. That vision included hotel development in the center of town, and identified the Henrikson shopping center as an "opportunity site" for future hotel development. Goals included a revitalization of downtown, improved walking and biking routes, and environmental improvements.

In December 2012, TRPA passed an update to its Regional Plan that encouraged environmental redevelopment of projects in town centers. In 2013, for the first time in over 60 years, the Henrikson site came up for sale. Over the previous decade, a hotel developer had been looking for a site to build a new hotel in North Lake Tahoe and was fortunate enough to buy the Henrikson property with the hopes of building what would become the Tahoe City Lodge.

As a result of vision and leadership from the Tahoe City Public Utility District and the support of Placer County and the North Lake Tahoe Resort Association, the utility district purchased the Tahoe City Golf Course with the intent, in part, to facilitate the creation of a hotel in downtown Tahoe City. With the vision of a vibrant new hotel in Tahoe City, the seeds were planted to support local business, local government, and the community with new revenue, a model environmental building, and a positive business climate.

The golf course adjoins the Henrikson property, and through a partnership with the hotel developer, the utility district provided land and density for the lodge project. The deal also returned significant benefits to the community, with the developer agreeing to build a new clubhouse for the golf course, creating new shared parking, and agreeing to restore 1.7 acres of Stream Environment Zone lands on the golf course.

The framework was in place, and over the next four years, the new property owner worked with the community, the approving agencies, partners, and environmentalists to design a hotel to replace the dilapidated buildings on the site. The community provided significant input and ultimately supported the Tahoe City Lodge project. Placer County was rigorous in its review while providing significant development incentives to help make the project financially feasible.

The Tahoe Regional Planning Agency saw the project as an example of the "environmental redevelopment" envisioned when the Regional Plan Update was passed in 2012. Working in collaboration with TRPA, the League to Save Lake Tahoe, and the community, project managers achieved significant environmental standards. For the first time in over a decade, the League to Save Lake Tahoe endorsed the project as "a model for Tahoe-friendly development."

The Tahoe City Lodge received its final approval in January 2017 and is poised to become the first new hotel in Tahoe City in over 50 years. After working through two lawsuits that held up the project for nearly three years, the lodge kicked off the demolition of the old buildings by throwing a party for the community. As a result of the generosity of the local community, thousands of dollars were raised at the event for Sierra Community House, a local nonprofit serving the North Tahoe community. The celebration was attended by hundreds of local community members, and the crowd enjoyed the celebration of a significant moment that will shape the future of the local community and the environment for decades to come.

Samir Tuma is the managing member of Kila Tahoe LLC, the developer of the Tahoe City Lodge. Samir also sits on the Board of Directors of the North Lake Tahoe Resort Association and has served on numerous other Tahoe area working groups.

Accolades for the Tahoe City Lodge

"Given its location, its environmental benefits, and the collaborative process that surrounded its development, the Tahoe City Lodge proposal stands as a model for how developers should proceed at Lake Tahoe."

Darcie Goodman Collins, executive director
League to Save Lake Tahoe

"Congratulations to the residents of Tahoe City for sticking with this project. Replacing legacy development that is harming the environment with this new hotel is an excellent example that through collaboration and commitment, positive redevelopment can happen in our communities."

Joanne Marchetta, executive director
Tahoe Regional Planning Agency

"Our community has waited decades to see this property redeveloped, and the Tahoe City Lodge will help improve our lakeside business communities. This is a celebration of reinvestment in our community, and something we can all be proud of."

Cindy Gustafson, supervisor
Placer County 5th District

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"Thank you for publishing a very informative paper. My brother and I are older and have been coming to Tahoe since 1950, the paper keeps us current on what's happening in Tahoe."
— D.M.

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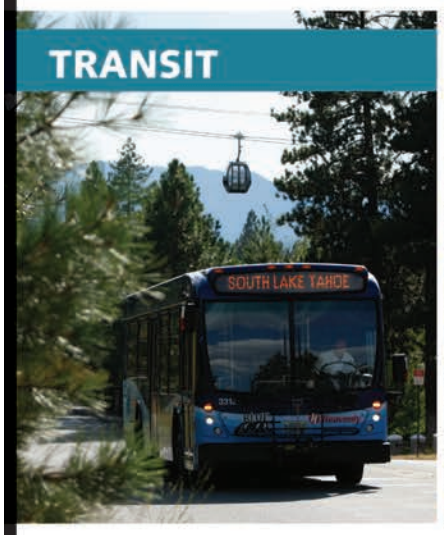
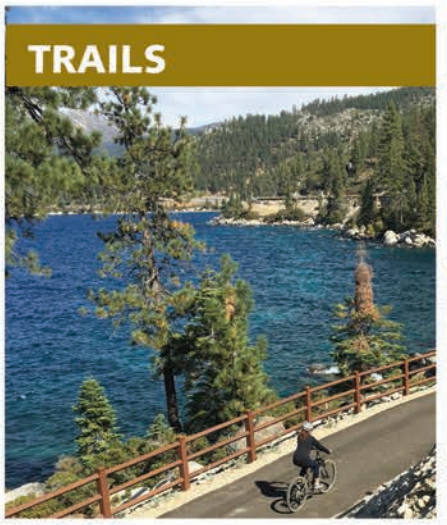
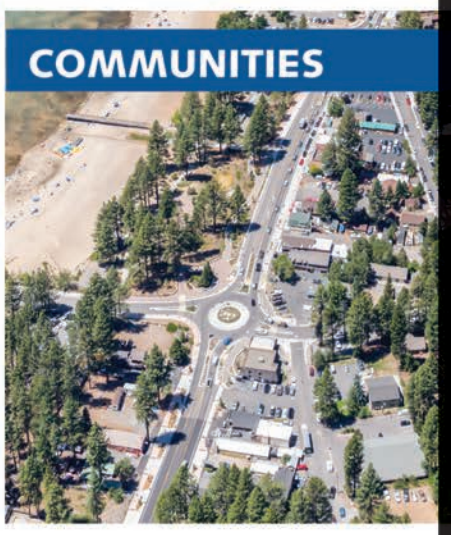
LINKING TAHOE

REGIONAL TRANSPORTATION PLAN 2045







The Regional Transportation Plan is the transportation vision for the Tahoe Basin. The plan focuses on transit, trails, technology, and communities to support the environment, economy, quality of life, and visitor experience. The Regional Transportation Plan will shape the next 20 years of Lake Tahoe's transportation system.

Help Shape the Future of Transportation at Lake Tahoe.

trpa.org/rtp

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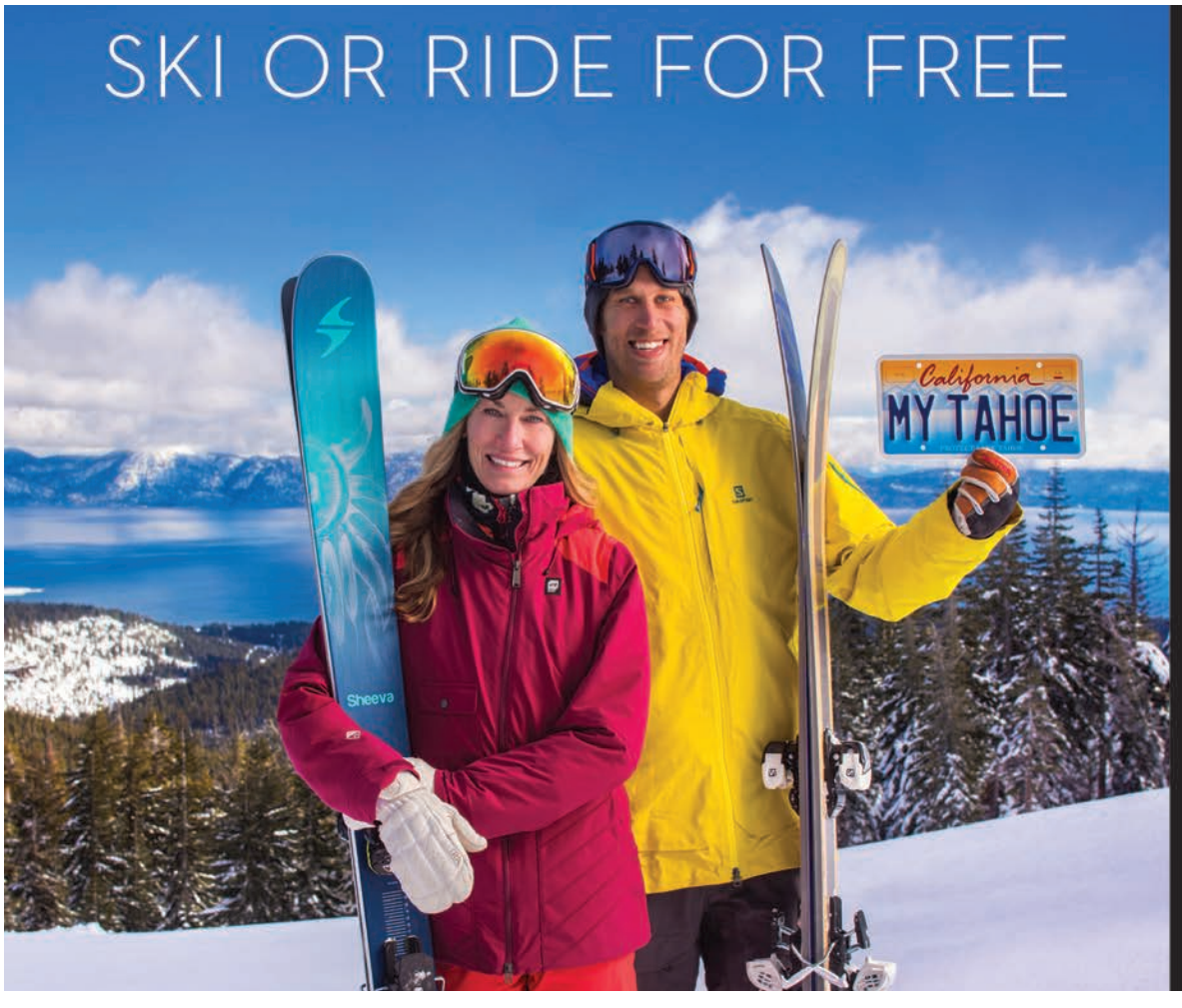

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MYTHS of Tahoe's depths

By David C. Antonucci
Special to Tahoe In Depth

One of the more persistent and morbid myths of Lake Tahoe is that preserved bodies of drowning victims exist in a watery morgue deep below the surface. Stories abound of Washoe tribal members, gangsters, 19th-century tourists, and hapless Chinese railroad workers who remain in a perpetually preserved state in their watery graves.

Jacques Cousteau was said to have seen suspended human bodies during a deep dive into Lake Tahoe. As the story goes, he emerged to say that the world was not ready to be told of what he saw.

These make for interesting tales, but there is no truth or factual documentation to back them up. Cousteau was never at Lake Tahoe.

The false premise is that the cold water of Lake Tahoe acts as a preservative, much like the cold storage units in a mortuary preserve deceased persons.

Unlike the dry, cold air in a morgue, the waters of Lake Tahoe are alive with aquatic microorganisms, such as bacteria and zooplankton, that feed on dead and decaying matter. Higher lifeforms, including worms, insects, and crayfish, also feed on dead and decaying matter.

Another way to look at this: Lake Tahoe has had fish for perhaps millions of years. Once these fish died and sank, what happened to their carcasses? If they did not decompose, then Lake Tahoe would have a thick layer of dead fish rising from its bottom.

When a person drowns, their lungs fill with water, and the body sinks. What happens next in Lake Tahoe is different than other lakes, most of which are shallower and warmer. If the drowning occurs away from the shore and in the deeper cold waters of Lake Tahoe, the victim sinks to a depth between 1,300 feet and 1,645 feet. At these depths, the temperature hovers at 41 degrees Fahrenheit, and the maximum pressure is an immense 732 pounds per square inch or about 25 times the pressure in a typical car tire. The cold and the extreme pressure exerted by the overlying lake water has a much different effect than in shallow, warm lakes.

In warmer bodies of water, decomposition of the body begins quickly as bacteria in the gut attack the internal organs. After a few days, gases from decomposition such as carbon dioxide and methane form bubbles that cause bloating in the abdominal cavity, and the corpse can rise to the surface through buoyancy.

In the depths of Lake Tahoe, the cold water dramatically slows but does not stop the decomposition process. The organisms in the water slowly consume the organic matter and produce byproducts such as gases.

Photos: David C. Antonucci
The deep water of Tahoe is a lure for divers (below) and a source of legends about how the lake preserves drowning victims.

The false premise is that the cold water of Lake Tahoe acts as a preservative, much like the cold storage units in a mortuary preserve deceased persons.

The extremely high pressure in deep water prevents the dissolved decomposition gases from forming a bubble as they would in a shallow water lake. This condition is like a bottle of carbonated water where the carbonation (carbon dioxide) remains dissolved because the bottle contents are under pressure. As a result, the decaying body does not rise and reposes on the lake bottom until fully consumed by the aquatic microorganisms and higher life forms.

As bodies lay on the lake bottom, sediment covers them. Over the long term, aquatic organisms reduce the bodies to almost nothing. However, its inorganic parts such as teeth fillings, body piercings, and joint replacements remain, and sediment gradually smothers these.

In 2011, the body of a scuba diver was recovered in 265 feet of water 17 years after he disappeared off Rubicon Point. The coroner described his body as about 90 percent preserved. How could this be? Does this incident prove the tales are true?

The diver wore a full diving suit that afforded some protection. In this case, the cold water slowed the action by gut bacteria, the depth pressure prevented the formation of decomposition gas bubbles, and the diving suit kept aquatic organisms from quickly devouring the rest of his body.

Stories of preserved bodies suspended in the deep waters of Lake Tahoe make for fascinating, if not ghoulish tales, but these do not pass the test of scientific scrutiny. Myth busted.

David C. Antonucci is a civil and environmental engineer and 44-year resident of Lake Tahoe. He is currently writing a book on the natural history and natural science of Lake Tahoe. In future articles in this series, he will debunk the myths about a prehistoric monster swimming the depths of Tahoe and whether there is a secret tunnel connecting Lake Tahoe with the mines in Virginia City. If you have any questions, you can reach him through his website www.TahoeFacts.com.